In This Issue—*The Chicago Show Is Next*

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MOTOR AGE

VOL. XLI
Number 4

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CHICAGO, JANUARY 26, 1922

Thirty-five Cents a Copy
Three Dollars a Year

—"but now you will really *know*"

"When you drove up, just now, you had your new radiator cover up too far. You didn't know she was boiling, though, till I took the cap off.

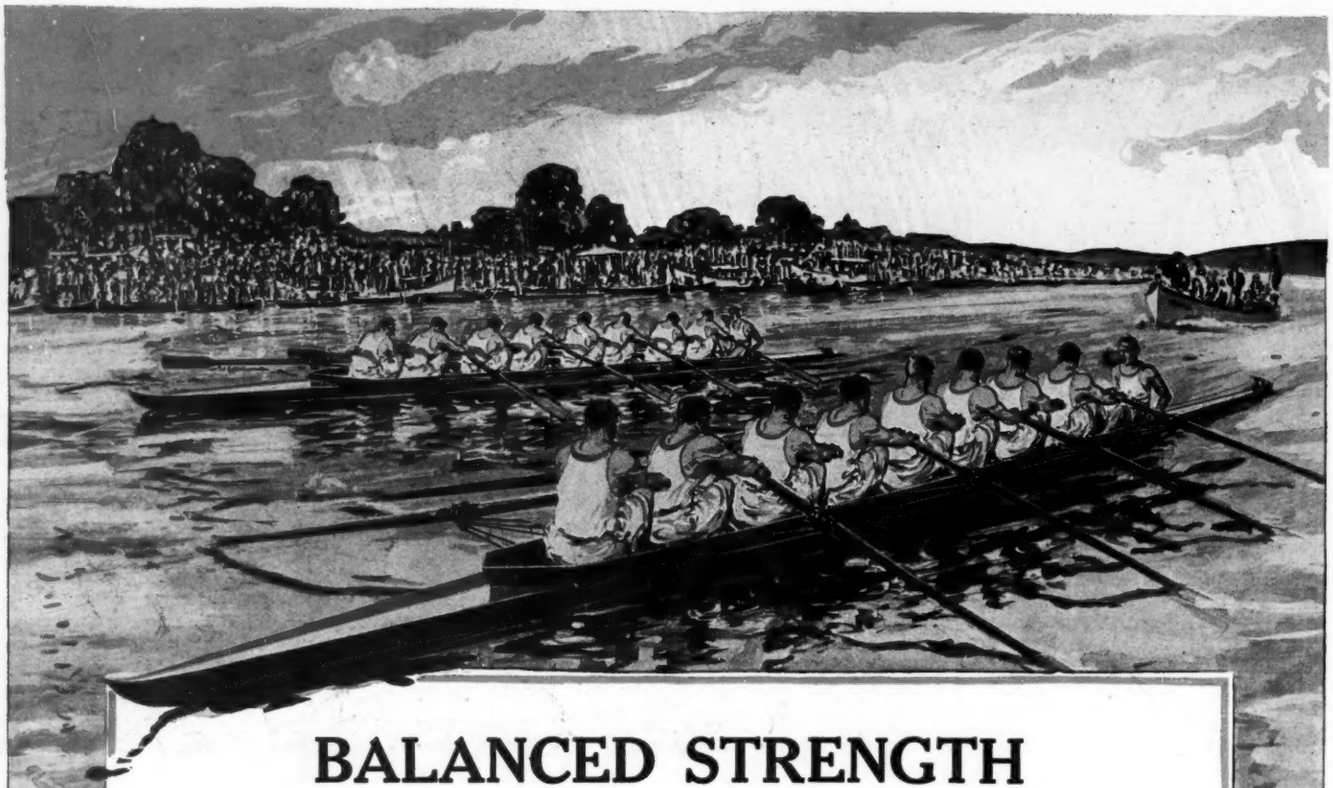
"But this Boyce Moto-Meter I've put on is going to cut out guesswork for you. Now you will really *know* when your motor is running too hot or too cold and how to regulate your radiator cover. You need to know both, this weather."

**"Ask 'em to buy"—
a Boyce Moto-Meter**

BOYCE MOTO METER

"Your car deserves one"

Entered as second class matter Sept. 19, 1899, at the post office at Chicago, Ill., under Act of March 3, 1879.



BALANCED STRENGTH

As a basis for effective team-work, EACH member of a boat crew must attain the highest possible standards of skill and endurance. Similarly, as a basis for superior performance, EACH unit in a motor vehicle must fulfill the utmost requirements of mechanical efficiency.

In recognition of this fundamental truth, many great manufacturing organizations have SPECIALIZED on the production and the perfection of individual units. As a result, SPECIALIZED cars and trucks, vehicles of masterpiece units, have become transportation realities.

SPECIALIZATION in manufacturing has brought about STANDARDIZATION of unit parts. For this reason, service organizations welcome the supremacy of SPECIALIZED vehicles. They KNOW they can render better service to owners of SPECIALIZED cars and trucks because genuine SPECIALIZED parts are always obtainable. Furthermore, the stocks of parts required for such servicing have been reduced to a minimum through standardization in design.

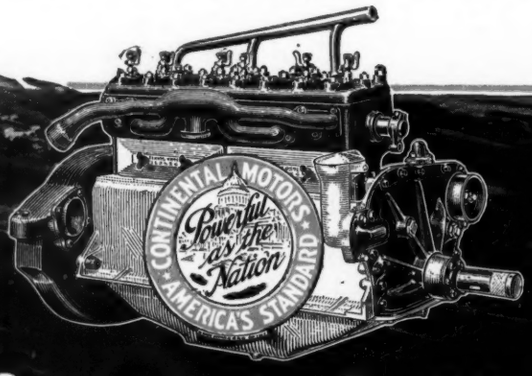
It is to the interest of service men, therefore, to further the popularity of vehicles that embody the best units that SPECIALISTS can build—such units, for instance, as the motor that is recognized everywhere by the insignia that stands for supremacy achieved through SPECIALIZATION—the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

CHICAGO—Booths 50 and 51 Gallery of the Coliseum

Offices: Detroit, U. S. A. Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World



Continental Motors

MOTOR AGE

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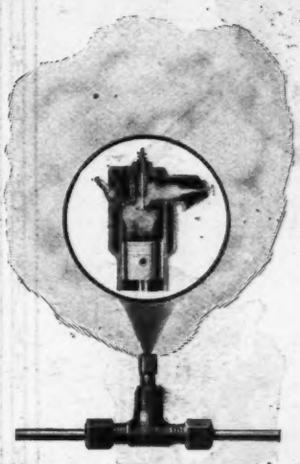
Presto Products

OVER ONE HUNDRED MOTOR CAR NECESSITIES



JORGENSEN

Now a Presto Product

The Jorgensen Vapor Primer is now a member of the famous group of Presto Products and as such will be sold and guaranteed through the jobbing trade.

Here we have a product that enjoys a national reputation for the excellence of its performance linked up with a house that has become firmly established upon the merit of its products.

We are now booking orders and making prompt shipments.

JOBBERS and DEALERS—Write for Presto Products catalog, and page "set-ups" for your 1922 catalogues.

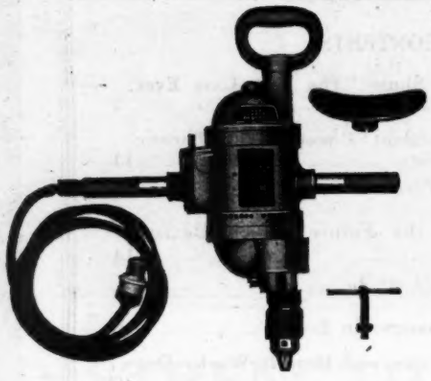
Metal Specialties Mfg. Co.
338-352 N. Kedzie Ave., Chicago

Jacobs Quality Chucks

The Business End of Good Drilling Equipment

PORTABLE DRILLS

are indispensable in the Modern Service Station



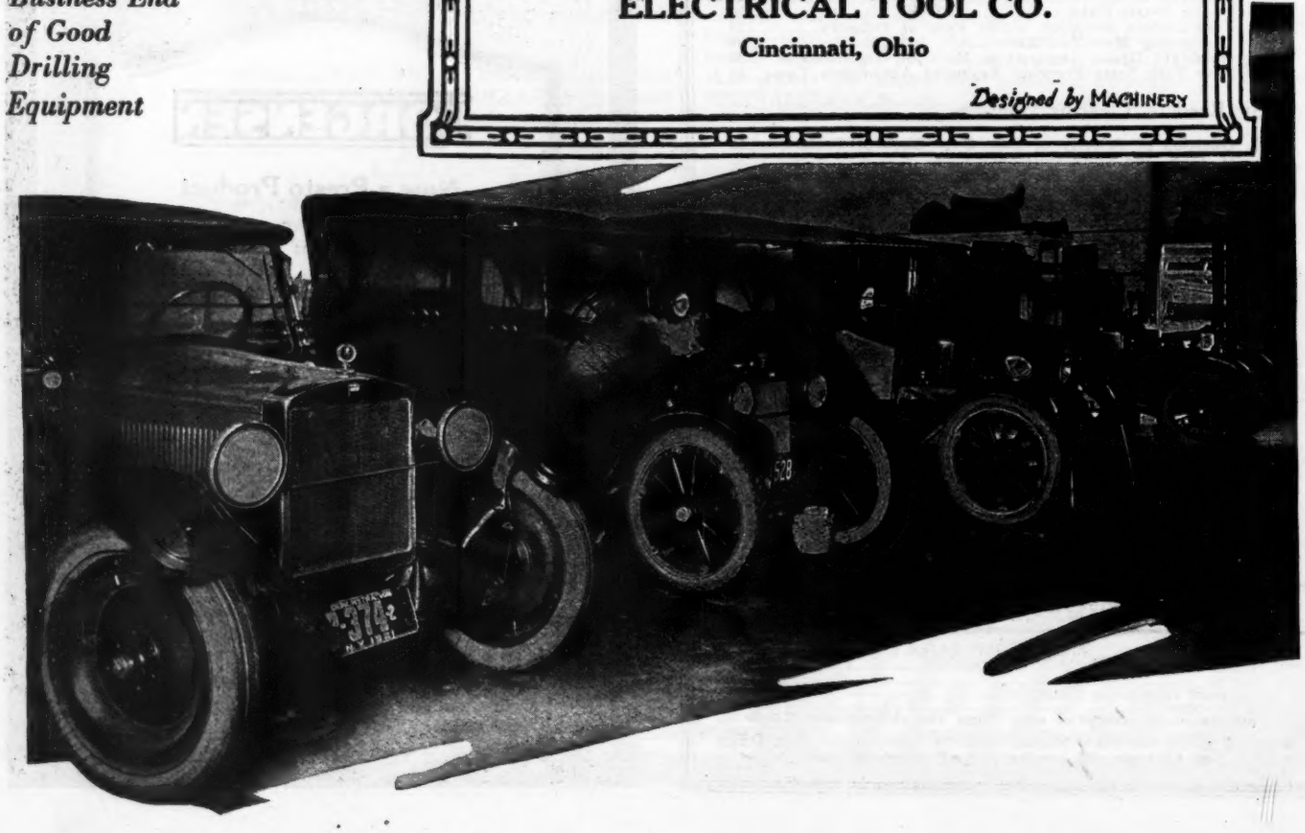
U. S. Ball Bearing Electric Drills with the air cooled Westinghouse motor in the following sizes: 3-16", ¼", 5-16", ⅜", ½", ⅝", ¾", ⅞", 1", 1¼".

made by

THE UNITED STATES ELECTRICAL TOOL CO.

Cincinnati, Ohio

Designed by MACHINERY



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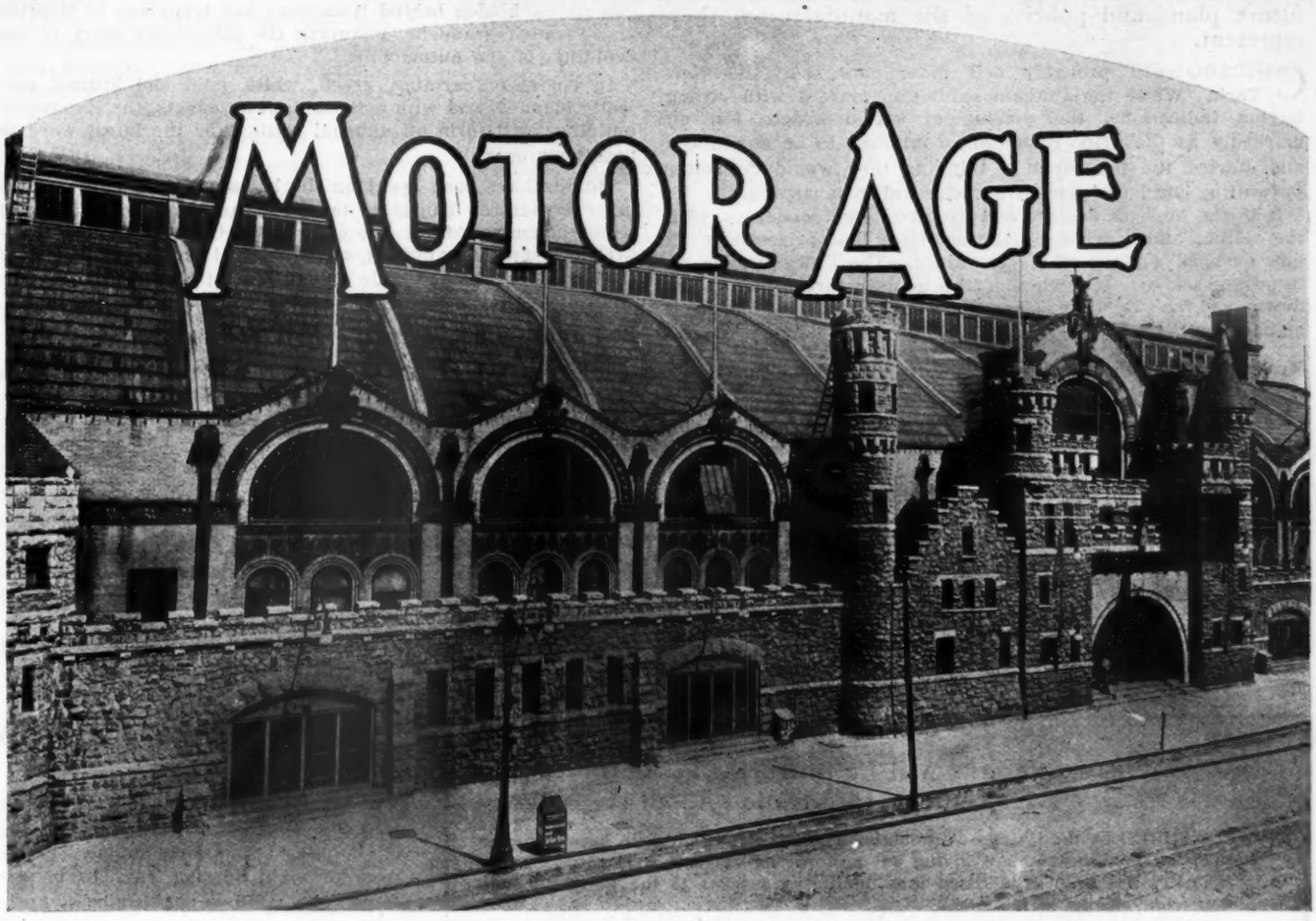

Chicago Coliseum, where 22nd Annual Automobile Show will be held Jan. 28-Feb. 4

Chicago Prepares to Show "Best Cars Ever Built"

NEW YORK Exposition Indicated Strong Tendency to Buy But Continued Price Reductions Decided Prospects to Wait—Big Business Expected at Chicago If Prices Remain Stable

WHEN the twenty-second national automobile show is opened in the Chicago Coliseum, Saturday, January 28, at 2 p. m., the second big gun in the automotive business stimulation campaign will have added its roar to the New York salvo and will morally reinforce all the dealers' shows in progress throughout the country.

If attendance figures of the New York exposition can be taken as a criterion of what may be expected at Chicago and the multitude of dealers' shows to be held in all cities of any size from now until late in April, then it may be foretold that these shows will also break previous records of popularity among public and dealers.

The public is intensely interested in the "best cars ever built," as this year's designs prove to be, and shows this interest in the way it responds to the opening of the automotive exposition doors.

MORE dealers attended the New York display than were present at the two preceding shows and a like example of dealer interest is expected to feature the Chicago National Exhibition. An examination of the schedule of dealers' meetings for show week indicates that too few of these meetings are contemplated by the distributors and manufacturers. That a greater number of dealer conferences are not to be held is regrettable in that dealers this year more than ever before need advice and counsel from the heads of the cars they sell

and with prices undergoing rapid changes as they have these dealers would appreciate a few remarks on the future plans and policies of the manufacturers they represent.

CHICAGO will probably sell more cars than did New York. While the Gotham exhibition started with strong buying indications, the placing of actual orders fell off markedly as the price reductions continued to be announced and started the prospects to thinking they would do better by waiting until the price avalanche had exhausted itself.

It is the hope of dealers and everyone else concerned with the selling and servicing of automobiles that prices have by now reached a plane of stable values. The Chicago show as it progresses will tell whether the manufacturers have come down as far as they can consistent with good business management.

Mr. Car Owner—the Big Boss

The shows present an opportunity to feel the buying pulse of the Car Owner—the Big Boss and the Meal-Ticket, if you please,—to hear and feel his attitude toward the automotive industry, to note the importance he attaches to this greatest single purchase, outside of a home, that he makes and to make a note of the things he expects and wants in an automobile. At these great motor displays, dealers, owners and prospective owners may view the products of the automotive industry ensemble and compare the lines they favor with the rest of the field.

A new mark in decorative effect in connection with vast expositions will be set at the show. A scheme has been involved that will convert the big buildings into bowers of color and beauty. The unsightly rafters and girders will be completely hidden behind trimmings and trappings of Moorish and Flemish grandeur, picturing the interesting story of the evolution of the automobile.

In colors of carmine, green, white, gold and bronze, perfectly blended, and with artistic lighting effects, the Exposition buildings will form an unusual setting for the latest word in passenger cars.

Months have been spent on the balcony fronts alone, working out nineteen panels of tapestry, each showing a story of prime interest. At the two ends of the Coliseum will be huge art glass mural paintings, of allegorical character. Each of these will be 110 feet wide and three feet high, indicating the enormity of the work.

Best Values Ever Offered

The cars will be placed in booths marked off by columns twenty feet in height, with clusters of brilliant lights on top. Here, as along the balcony fronts, the tapestry idea will be featured.

Manufacturers have attained greater efficiency and economy, and purchasers of automobiles today receive more for their money than ever before in history. Eighty-one makes of automobiles will feature the "Million Dollar Show," and 195 accessory manufacturers will display hundreds of new devices which will represent the last word in comfort, economy and convenience.

The Jackson Motors Corp. is the only car exhibitor at Chicago which was not present at New York.

Chicago Show Salesmen Will Be Instructed to Give Uniform Information About the Industry

SPONSORED by the Chicago Automotive Trade Assn., the idea to have the salesmen at the Chicago show giving out uniform information with respect to the industry has been crystallized into intelligent answers to the questions most common from visitors at the shows.

At all former shows, information took on the form of personal ideas and conclusions that were, in many cases, misleading. To avoid a repetition of this condition, the following answers to common questions have been suggested and with slight, if any, changes will be used during the Chicago show. The idea has taken hold big and promises to become the practice at all future shows.

HOW IS BUSINESS?
Much improved. 1922 will be a year of good business.

HAVE PRICES REACHED THE BOTTOM?
Present prices are below cost anticipating quantity business—if not secured, prices must advance.

WHAT IS MY USED CAR WORTH?
Just what it will sell for, less conditioning and sales cost. New car price reductions have, of course, lowered used car values.

HOW ABOUT PRICE GUARANTEES?
We don't guarantee. Practically all manufacturers have discontinued price guarantees.

WHAT IS YOUR OPINION OF——————CAR?
I am unfamiliar with that make of car and cannot, therefore, give an opinion.

WILL THERE BE MORE FAILURES AMONG THE MANUFACTURERS THIS SPRING?
No. All the weak ones have already been eliminated.

THE INDUSTRY WAS HIT PRETTY HARD LAST YEAR, WAS IT NOT?
No. The automobile industry suffered less than the other two largest manufacturing industries—STEEL AND PACKING. The STEEL industry suffered a shrinkage of sixty per cent; the PACKING industry suffered fifty per cent; The AUTOMOBILE industry suffered only twenty-five per cent.

WITH THE NEW LOW PRICES, HAVE THE MANUFACTURERS CHEAPENED THE PRODUCT?
No. They have not. On the other hand, the cars are vastly improved; as, for instance, cite your own additions over 1914.

WHERE IS——————CAR EXHIBIT?
Each salesman should be equipped with a diagram showing the location of the passenger car exhibits (in the Coliseum), then escort prospect to the exhibit he is interested in and introduce him.

Cars De Luxe at Chicago Salon

WITH three of the five highest priced automobiles now on the world's markets included in the group of eight foreign cars to be exhibited, the sixth annual Chicago Automobile Salon, staged in the ballroom and French restaurant of the Drake Hotel, will present a new interest and appeal to that limited class of motorists, who take pride in owning the best in motor equippage.

It will be held co-incidentally with the National Automobile Show, January 28 to February 4, inclusive, and, in addition to the eight makes of European cars, there will be shown twelve makes of leading high-grade American chassis and seven prominent custom body builders will have special exhibits. Altogether, the latest creations of a score of the leading carrosseries of Europe and America will be found on the various chassis, so that the Salon will serve to establish the 1922 fashions on coachwork.

Twenty Cars to be Exhibited

England, France, Belgium, Italy, Germany and the United States will be represented by twenty cars on exhibition at the forthcoming Salon. Incidentally, in number of exhibits and in number of individual cars to be shown, as well as in the representative group of foreign cars, this year's Salon far surpasses any of its predecessors. It will be featured not alone by exquisite creation in custom coachwork, the very acme of the art, but mechanical innovations and refinements in chassis design and construction. Among the latter may be men-

tioned straight eight motors, four wheel brakes and new methods of spring suspension.

Cars to be exhibited by their makers or importers include the Benz, Cunningham, Daniels, Duesenberg, Fiat, Hispano-Suiza, Isotta Fraschini, Itala, Minerva, Rolls-Royce, Voison and Winton. Those to be shown by coachmakers include Lafayette, Lincoln, Locomobile, Marmon, Packard Twin Six, Pierce-Arrow, Rauch & Lang and Stevens-Duryea. Custom body builders having special exhibits are Baker, R. & L., Currier, Cameron, de Causse, Fleetwood, Graff, Kimball and Smith-Springfield.

S. A. E. Activities for Show Week

AS in former years, the Society of Automotive Engineers is going to put on a series of technical meetings and dinners during the week of the Chicago show. The technical sessions will be held in the Monadnock building, beginning at 10 o'clock in the morning. The Chicago meeting of the society will be turned over to automotive service and maintenance subjects. Engineering problems relating to service will be discussed and the speakers for this meeting are men well qualified to handle these subjects.

The following papers have been prepared for presentation:

Some Criticisms of Automotive Engineering by a Service Man—By B. M. Ikert, Technical Editor of MOTOR AGE.

The Car Owner and the Service Man and Some of the Things Necessary to Keep Both Happy—J. F. Page, general manager of service, Packard Motor Car Co., Chicago.

Commercial Body Supply and Service—By C. M. Manly and C. B. Veal, consulting engineers.

The Progress Made in Garage Repair Equipment—By H. C. Buffington, Weaver Mfg. Co., Springfield, Ill.

On Friday, Feb. 3, the society members and friends have been invited to the Ryerson Physical Laboratory, where at 8 p. m. Prof. H. B. Lemon, of the University of Chicago, will present a talk entitled, "Modern Ideas on the Nature of Matter." The dinner this year will be at the Drake Hotel. Harry Horning, of the Waukesha Motor Co., will act as toastmaster. All the arrangements of the Chicago meeting are in charge of the Mid-West section of the society.

The nature of the program for the technical sessions indicates quite forcibly the extent to which the industry is going after the problems of service. When a body of engineers takes up the question of maintenance, there is every assurance that the future will see our cars, trucks and tractors designed and built much more accessible, with the major thought of cutting service and maintenance cost to the minimum. There is a strong tendency for service to be sold on a better basis than it ever has been done before, but, to insure this, the product must be designed and built accordingly.

Pictured above are the settings of two previous national automobile shows in the Chicago Coliseum. Nineteen panels conveying in picture form the interesting story of the automobile and the important part it enacts in contributing to the world's progress and comfort, will be a feature of the 1922 display

N. A. D. A. Annual Meet

The National Automobile Dealers' Assn. will hold its annual meeting at the La Salle Hotel Jan. 30 and 31, when new officers will be elected and plans and policies outlined for the coming year. The big annual N. A. D. A. frolic will take place in the La Salle Monday night, Jan. 30.

When You Come to Chicago

Some Suggestions for an Evening's Entertainment During Show Week.

Attractions booked for Chicago theaters during the week of the Automobile Show are as follows:

Frank Bacon, in "Lightnin'," at the Blackstone.

Francine Larrimore, in "Nice People," at the Cort.

Margaret Anglin, in "The Woman of Bronze," at the Princess.

Ruth Chatterton, in "Mary Rose," at the Illinois.

"The Nightcap," at the Playhouse.

Bert Williams, in "Under the Bamboo Tree," at the Studebaker.

Van & Schenk, Mary Eaton and others, in Ziegfeld Follies, at the Colonial.

Genevieve Tobin, in "Little Old New York," at Cohan's Grand.

Sir Harry Lauder, at the Great Northern.

Fred Hillebrand, in "The Rose Girl," at the La Salle.

Walker Whiteside, in "The Hindu," at the Central.

Laura Hope Crews, in "Mr. Pim Passes By," at the Powers.

Robert D. Mantell, in Shakespearean presentations, at the Olympic.

At the Palace, State-Lake and Majestic, Orpheum vaudeville will be the attraction, as usual, while at the Apollo, Shubert vaudeville will be featured.

Chicago Exhibits Not at New York

Accessory and equipment companies at the Chicago Show which did not display at New York are listed below. Complete lists of passenger cars, accessories and equipment exhibitors at the New York and Chicago Shows were printed in the Jan. 5 issue.

A. C. Spark Plug Co.....Flint, Mich
Alfon Bahr, ...Chicago
Algonquin Electric Mfg. Corp.....
.....Poughkeepsie, N. Y.
Alta Co.....San Francisco, Cal.
American Drop Forging Inst.....Cleveland

(*Continued on next page.*)

Dealers' Exhibits Make 1922 Greatest Show Season

AUTOMOBILE SHOWS

San Francisco	Automotive Equipment Exposition	Jan. 21-27
Detroit	Automobile Show	Jan. 21-28
Cleveland	Cleveland Mfrs.-Dealers' Assn.	Jan. 21-28
Baltimore	Annual Automobile Show	Jan. 21-28
Reading, Pa.	Sixth Annual Automobile Show	Jan. 23-28
Portland, Ore.	Annual Automobile Show	Jan. 23-29
Montgomery, Ala.	Alabama Automobile Dealers' Assn.	Jan. 23
Binghamton, N. Y.	Binghamton Dealers' Assn	Jan. 23-28
Toledo	Automobile Show	Jan. 23-28
Middletown, Conn.	Automotive Dealers' Assn.	Jan. 25-31
Allentown, Pa.	Lehigh Automobile Trade Assn.	Jan. 28-Feb. 4
York, Pa.	York County Dealers' Assn.	Jan. 28-Feb. 4
Chicago	National Automobile Show	Jan. 28-Feb. 4
Chicago	Automobile Salon	Jan. 28-Feb. 4
Hudson, N. Y.	Automobile Show	Jan. 30-Feb. 4
Sunbury, Pa.	Automobile Show	Jan. 30-Feb. 4
Erie, Pa.	Automobile Show	Jan. 30-Feb. 4
Scranton, Pa.	Annual Automobile Show	Jan. 30-Feb. 4
Olean, N. Y.	Automobile Show	Jan. 31-Feb. 4
Lancaster, Pa.	Automobile Trade Assn.	Feb. 1- 4
Pontiac	Pontiac Automobile Dealers' Assn.	Feb. 1- 4
Columbus	Columbus Automobile Dealers' Assn.	Feb. 2- 8
Tampa, Fla.	South Florida Fair Assn.	Feb. 2-14
Troy, N. Y.	Eighth Annual Used Car Show	Feb. 4-11
Youngstown	Youngstown Dealers' Assn.	Feb. 4-11
Scranton, Pa.	Annual Motor Truck Show	Feb. 6- 9
London, Ont.	Nat'l Motor Show of West Canada	Feb. 6-11
Minneapolis	Tractor Show	Feb. 6-11
Minneapolis	Automobile Show	Feb. 4-11
Winnipeg, Can.	Canadian Equipment Assn.	Feb. 6-11
Schenectady	Schenectady Dealers' Assn.	Feb. 6-11
Flint, Mich.	Mich. Automotive Trade Assn.	Feb. 8-11
Kansas City	Kansas City Motor Dealers' Assn.	Feb. 11-18
Atlanta	Southern Automobile Show	Feb. 11-18
San Francisco	6th Annual Pacific Automobile Show	Feb. 11-18
Huntington, W. Va.	Automobile Show	Feb. 13-18
Wilkes-Barre, Pa.	Dealers' Assn.	Feb. 13-18
Kalamazoo, Mich.	Mich. Automotive Trade Assn.	Feb. 14-18
Albany	Automobile Dealers' Assn.	Feb. 18-25
Hartford, Conn.	Hartford Automobile Dealers' Assn.	Feb. 18-25
Salt Lake City	Automobile Show	Feb. 20-25
Duluth, Minn.	Automobile Show	Feb. 20-25
Dallas, Tex.	Automobile Show	Feb. 20-25
Bethlehem, Pa.	Automobile and Accessory Show	Feb. 20-25
Louisville, Ky.	14th Annual Automobile Show	Feb. 20-25
Syracuse	14th Annual Automobile Show	Feb. 20-25
Gr. Rapids, Mich.	Michigan Automotive Trade Assn.	Feb. 20-25
Norfolk, Va.	Automobile Show	Feb. 20-25
Deadwood, S. D.	Deadwood Business Club	Feb. 21-25
Ottumwa, Iowa	Automobile Show	Feb. 22-25
Clinton, Ia.	Automobile Show	Feb. 22-25
Trenton, N. J.	Car, Truck & Accessory Show	Feb. 22-25
Springfield, Ill.	Automobile Show	Feb. 23-25
Montreal	Automobile Show	Feb. 25-Mar. 1
Des Moines	Winter Automobile Show	Feb. 26-Mar. 3
Bethlehem, Pa.	Truck and Tractor Show	Feb. 27-28
Amsterdam, N. Y.	Automobile Show	Feb. 27-Mar. 4
Elmira, N. Y.	Elmira Automobile Club	Feb. 27-Mar. 4
Muskegon, Mich.	Michigan Automotive Trade Assn.	Feb. 27-Mar. 4
Portland, Ore.	Portland Dealers' Assn.	Feb. 27-Mar. 4
Springfield, Mass.	7th Annual Automobile Show	Feb. 27-Mar. 4
Windsor, Ont.	Automobile Show	Feb. 27-Mar. 4
Bay City, Mich.	Michigan Automotive Trade Assn.	Feb. 28-Mar. 4
Wichita, Kan.	Wichita Motor Trade Assn.	Feb. 28-Mar. 4
Harrisburg, Pa.	Automobile Show	Mar. —
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Galesburg, Ill.	Galesburg Automobile Dealers' Assn.	March
Madison, Wis.	Four Lakes Bldg	March
San Antonio	Automobile Trades Assn	March
St. Louis	Manufacturers' and Dealers' Assn.	March
Brooklyn	Eleventh Annual Show	Mar. 4-11
Saginaw, Mich.	Michigan Automotive Trade Assn.	Mar. 6-10
Indianapolis	Annual Automobile Show	Mar. 6-11
Nashville	Nashville Automobile Trades Assn.	Mar. 6-11
Wilmington, Del.	Wilmington Trade Assn.	Mar. 6-13
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Logansport, Ind.	Automobile Show	Mar. 16-18
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Jacksonville, Ill.	Automobile Show	Mar. 27
Oklahoma City	Automobile Show	Mar. 27-Apr. 1
Ben. Harb., Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Quincy, Ill.	Automobile Show	Mar. 28-Apr. 1
Washington, D. C.	Automotive Trade Assn.	Mar. 29-Apr. 1
Bat. Creek, Mich.	Michigan Automotive Trade Ass.	April 2- 8
Buffalo, N. Y.	Automobile Show	Apr. 10-15
Hartford, Conn.	Automobile Show	Sept. 4- 9

Chicago Exhibits Not at New York

(Continued from preceding page.)

American Taximeter Co.	New York
Apollo Magneto Corp.	Kingston, N. Y.
Badger Mfg. Corp.	Milwaukee
Alfred E. Baker & Co.	Chicago
C. G. Bird	Chicago
Borg & Beck Co.	Chicago
Bowen Products Corp.	Auburn, N. Y.
Buda Co.	Harvey
Edw. G. Budd Mfg. Co.	Philadelphia
Buell Mfg. Co.	Chicago
Bunnell & Co.	Chicago
A. S. Campbell Co.	E. Boston, Mass.
Champion Mfg. Co.	Chicago
Chicago Tool & Kit Mfg. Co.	Chicago
Coffield Tire Products Co.	Chicago
Columbia Axle Co.	Cleveland
Damon Mfg. Co.	Chicago
Dependable Mfg. Co.	Chicago
A. J. Detlaff Co.	Detroit
Geo. W. Dover	Providence, R. I.
Elgin Rubber Ace Co.	Elgin, Ill.
L. B. Edwin Co.	Chicago
Eureka Auto Lock Co.	Chicago
Foster-Johnson	Elkhart, Ind.
Gemco Mfg. Co.	Chicago
Gits Bros. Mfg. Co.	Chicago
Globe Mfg. Co.	Battle Creek, Mich
Graynic Corp.	Chicago
C. M. Hall Lamp Co.	Kenosha, Wis.
L. P. Halladay Co.	Decatur, Ill.
Hayes-Ionia Co.	Grand Rapids, Mich
Ernest Holmes Co.	Chattanooga
Imperial Brass Mfg. Co.	Chicago
David Lupton's Sons Co.	Philadelphia
Michigan State Auto School	Detroit
Monarch Metal Prod. Co.	St. Louis
Naperville Machine Co., Inc.	Naperville, Ill.
Ner-a-Car Corp.	Syracuse, N. Y.
Panyard Piston Ring Sales	Chicago
Rajah Auto Supply Co.	New York
Rajo Motor Co.	Racine, Wis.
Ryser Machine Works	Chicago
Trindl Co.	Chicago
Walker Mfg. Co.	Racine, Wis.
F. Walkow & Sons	Louisville
Joseph Weidenhoff	Chicago
Weidley Motors Co.	Indianapolis
Westinghouse Lamp Co.	New York
S. S. White Dental Mfg. Co.	New York
White Products Co.	Chicago
Zenith Carburetor Co.	Detroit

EXHIBITORS IN THE GREER BLDG., ADJOINING COLISEUM

F. A. Ames Co.	Owensboro, Ky.
Headen Motor Co.	Chicago
Monroe Body Co.	Ludington, Mich.
Robt. M. Bowes Co., Inc.	Indianapolis, Ind.
Eagle-Ottawa Leather Co.	Grand Haven, Mich.
Auto Specialties Mfg. Co.	St. Joseph, Mich.
A. & E. Auto Top Co.	Ypsilanti, Mich.
Helsbels Mfg. Co.	Chicago
National Collapsible Rim Co.	New York, N. Y.
Steel Wings Co.	Chicago
Miles Piston Ring Sales Co.	Chicago
Chicago Chemical Co.	Chicago
Charter Double Disk Wheels Co.	Chicago
Cleveland Pneumatic Tool Co.,	Cleveland

MEETINGS SCHEDULED FOR SHOW WEEK IN CHICAGO

Jan. 30-31—N. A. D. A. convention at La Salle hotel.

Jan. 30—Manufacturers of headlight devices, La Salle.

Jan. 31—Old Timers' banquet, Congress hotel.

Jan. 31—Mid-West Rubber Manufacturers' Assn., Morrison hotel.

Jan. 31—Illinois State Automobile Assn., Metropole hotel.

Jan. 31—Automotive Electric Service Assn., La Salle hotel.

Feb. 1—Society of Automotive Engineers, Drake hotel.

Feb. 1—Meeting of the executive committee, National Automobile Chamber of Commerce.

Tractor Makers Confident Buyers Will Throng Coming Power Farming Show

OPTIMISTIC Outlook for 1922—Necessity of Decreasing the Cost of Farming and a Greater Knowledge of New Developments in Agricultural Methods Expected to Result in Sales at Twin Cities Exhibit, Feb. 6-11

By CLYDE JENNINGS

THE Seventh Annual National Tractor and Power Farming Show will be held Feb. 6 to 11 in the New Exhibit Building in the Minnesota State Fair grounds midway between Minneapolis and St. Paul. The dates are the same as those of the Twin Cities Automobile Show, which will be held in the Overland Building, which, also, is available to the residents of the two cities. A special bus service will be given to visitors of either show to reach the other exhibition. These two attractions are expected to give to the Twin Cities the greatest automotive week they have ever had.

The building in which the shows are to be held are well known to the people of both cities and are easily accessible. That in which the Tractor Show will be held is a new structure, and has been used in a finished state for only two exhibitions; once as a part of the State Fair and later for the National Dairy show. More than $50,000 has been expended to supply sufficient heating apparatus. It has 75,000 square feet of floor space, all of which will be filled with exhibits. As the building is a part of the State Fair Grounds, ample street car facilities exist, and it is also on the regular bus line connecting the Twin Cities.

There has been a Tractor Show in the Twin Cities for the last several years, but all previous shows have been held as a part of the automobile show. This year the National Association of Farm Equipment Manufacturers decided to make the show entirely independent of other attractions so that the educational feature might be made more important and more closely hold the attention of those who wished to learn this new and important science of farming.

Educational Program Planned

In keeping with the educational plan, an intensive short course in tractor use and service and of power farming has been arranged under the direction of Prof. William Boss of the Agricultural Engineering Department of the University of Minnesota College of Agriculture. Professor Boss will be assisted by instructors from the various agricultural colleges of the northwest and by factory experts and field service men.

It is planned that this course shall include in its scope an outline of all that the farmer and tractor dealer need know about the tractor and newer science of power farming as a basis of practical work. As a part of this course, there will be a demonstration of machinery to illustrate the various parts of the tractor mechanism and a moving picture theater where films will be shown illustrative of tractor service and use and other forms of power farming. This course is to be made one of the big features of the show.

Makers Optimistic as to Results

Previous tractor shows in this section have been given under the auspices of the Northwest Tractor Trade Assn., and this body is supporting this year's exposition. J. E. Gardiner, president of the Northwest Association and manager of the Minneapolis branch of the J. I. Case T. M. Co., is one of the chief boosters of the show and after a recent trip over the territory expressed an opinion that the show would attract the largest crowds ever attending such a show and that the stage was set for a big year in the sale of tractor equipment.

When the show was first suggested for this section there was considerable division in the ranks of the Northwest Association as to the wisdom of such a move. Much of this division of opinion, it seems, was based on the experience at Fargo last summer when the farmers refused to attend a demonstration and a belief that the farmers of the Northwest would not be ready to buy additional equipment before the 1922 crop was harvested. Since the time this was suggested, and the beginning of the year, this opinion has been changed and practically all of the critics are now optimistic as to the show.

One of the factors in bringing about the change of opinion was the meeting of the Minnesota Implement Dealers last week. These men not only declared that they were going to sell implements this year, but they backed up these declarations by placing orders with the jobbers for the instruments. And it is quite surprising that many of these orders were placed with companies that are selling for cash.

This is regarded as excellent evidence that there still is money in the Northwest. The implement dealers are going to pay their own money for the merchandise, or, at least, finance the purchase themselves, and they expect to sell their wares to farmers on very short terms. As the implement dealer knows the farmer better than anyone else, his word, when backed by money, must be regarded as worth-while opinion. As a result of a different vision of the future, most of those who opposed the show have become supporters of it and the list of big manufacturers not represented in exhibits will be a very short one.

Implement Dealers Hold Successful Meet

It has been the opinion of many interested persons in Minneapolis that the success or failure of the Minnesota Implement Dealers' meeting would, to a very large extent, tell the story of the Tractor and Power Farming Show. This was re-

garded in a good deal the same way as the politicians used to regard the Maine election, which took place before the national vote. This view appears to be a perfectly reasonable one and, if it is, the tractor show is going to be a huge success. The attendance at the dealer meeting was larger than expected, the spirit was far greater than anyone anticipated, and the buying heavier.

Then, just to show how they felt about it themselves, the implement dealers adopted the slogan, "Two With You," which means that each man present pledged that he would come back to the tractor show and bring two others with him.

In discussing this show, Finley P. Mount, president of the Advance Rumley Co., and one of the original boosters of the show, said:

"The show is certain to be a success. The very things that have been cited against it are now in its favor. The low price of farm products has turned the attention of the farmer to the cost of production and he is looking about for the best method of reducing that cost. The progressive farmer knows that the answer is in power farming and he will come to see for himself. The dealer, too, is alive to the newer conditions, and he will come to see.

"The development of the tractor business has been phenomenal and I look for 1922 to be a year of great growth, and for a better and a sounder reason than in some previous years."

This, to a very large extent, expresses the opinion held by many men in the industry. E. M. Jenkins, manager of the Oliver Chilled Plow Co., branch at Minneapolis, said:

"I am an optimist as to this show. I know that the farmer who is now selling grain below what it cost him to produce is giving a great deal of attention to the question of cost. It is not in his power to raise the selling price to a suitable cost, but he thinks he can reduce the cost. He is looking about for the solution, and he is finding it in the tractor and the proper power farming equipment.

Lower Farming Cost Gaining Favor

"The agricultural schools in this great Western farming country are opening the way for power farming. Each year they are sending back to the farms thousands of well trained and educated young men and the farm is never the same after these young men reach home. There is no question as to their influence. They not only change the home farm but the entire community. These are the men who come to the shows and who bring neighbors with them.

"The question this year is not, can the farmer buy, for we know there is much money in the country. The question is, will the farmer be convinced that he is getting a dollar's worth for each dollar he puts into the implement, whether it be a tractor or something else. The farmer has seen his produce fall below its worth, now he is going to refuse to buy until he thinks the other article is brought to a figure that at least represents a proper value. That will be the test this year. Price adjustments to actual value are the need of the time. You cannot fool a farmer much on the value of machinery. He has a basis of comparison and he can pretty well arrive at a very intelligent opinion.

"I am one of those who regret that the tractor show was not hooked up more carefully with the automobile show. A good many of the automobile dealers who jumped into the implement business in 1917, when the car business appeared to be due for a vacation, have made good with implements. A few have dropped out, but some of the very best farm power dealers also sell automobiles. This is especially so in communities where cars are sold chiefly to farmers."

Railroads Give Reduced Rates

The nature of the exhibits at the Tractor and Power Farming Show have not been clearly outlined. It is expected, however, that, as space allowance has been ample in most cases, complete lines will be shown. Trucks made by implement houses are expected to be quite prominent. There will be at least four new tractors on exhibition.

There is ample evidence that the educational value of the show has made the proper impression in certain quarters. Governor Prues has written a letter warmly indorsing it. A very helpful indorsement has come from the railroads, which have granted a fare of one and one-half for the round trip and half of that fare for children, which is said to be the lowest rate ever granted on the Northwestern railroads.

An attractive multi-colored poster is being distributed to promote publicity for the 7th National Tractor and Power Farming Exposition

S. A. E. Will Meet Thursday

On Thursday the Society of Automotive Engineers will hold a session at the Radisson Hotel. The day will be devoted to the reading of papers and on subjects of interest to the tractor industry and a discussion of the same. Standardization will be one topic and P. M. Heldt, engineering editor of Automotive Industries, will read a paper on this topic. There will be a dinner at night, the speakers for which have not been announced.

The same evening there will be a dinner for county agricultural agents and farm bureau men. James R. Howard, president of the American Farm Bureau, will be the speaker. During the week the Minnesota Brotherhood of Threshermen will hold their annual meeting.

The automobile show managers are counting it to their advantage that the tractor show has gained the fare concessions. The motor car trade in the Northwest has been very good this winter and the use of cars has been more general than ever before. Indeed, hundreds of people have written to the automobile club and to the show managers about garaging space during the show, saying it is their intent to drive over the new Minnesota highway to these shows. These highways are well surfaced and are kept clear of snow, and, as the people in that section are not afraid of cold, it is likely that there will be quite a large attendance of automobiles.

Exhibitors at Seventh Annual Tractor and Power Farming Show, Minneapolis, Feb. 6-11

Society of Automotive Engineers, New York.
American Society of Agricultural Engineers, Ames, Ia.
Aultman-Taylor Mach. Co., Mansfield, O.
American Fruit Grower, Chicago.
Allis Chalmers Mfg. Co., Milwaukee.
Aro Mfg. Co., Minneapolis.
Advance Rumely Thresher Co., La Porte, Ind.
The Avery Co., Peoria, Ills.
Bear Tractors, 150 Nassau St., New York.
Robert Bosch Magneto Co., New York.
Bryan Harvester Co., Peru, Ind.
The C. L. Best Tractor Co., San Leandro, Cal.
Bassick Mfg. Co., Chicago.
The Bates Mach. & Tractor Co., Joliet, Ill.
Beeman Tractor Co., Minneapolis.
The Chilton Co., Philadelphia.
The Central Tractor Co., Greenwick, Ohio.
The Cleveland Tractor Co., Cleveland.
Clark Turner Piston Co., Los Angeles.
The Clarke Publishing Co., Madison, Wis.
Capper Publications, Topeka, Kans.
The Climax Engineering Co., Clinton, Ia.
J. I. Case Threshing Mach. Co., Racine,
W. E. Cook Co., Minneapolis.
The Dakota Farmer, Aberdeen, S. Dak.
Eisemann Magneto Corp., Brooklyn.
Electric Wheel Co., Quincy, Ills.
The Fafnir Bearing Co., New Britain, Conn.
Farm Implement News, Chicago.
Farm Implements & Tractors, Minneapolis.
The Federal Oil Co., Minneapolis.
The Fulton Co., Milwaukee.
Foote Bros. Gear & Mach. Co., Chicago.
Farm Machinery-Farm Power, St. Louis.
The Goodyear Tire & Rubber Co., Akron, Ohio.
The Gurney Ball Bearing Co., Jamestown, N. Y.
Grid Iron Grip Wheel Co., Toledo.
Gray Tractor Co., Inc., Minneapolis.
Hart Parr Co., Charles City, Ia.
The Heinze Elec. Co., Lowell, Mass.
Holt Mfg. Co., Peoria.
Huber Mfg. Co., Minneapolis.
Hyatt Roller Bearing Co., Chicago.
Implement & Tractor Age, Springfield, Ohio.
Imperial Belting Co., Chicago.
S. K. F. Industries, New York.
The Ironsides Co., Columbus, Ohio.
Indian Refining Co., New York.
Implement & Tractor Trade Journal, Kansas City, Mo.
K-W Ignition Co., Cleveland.
Kohler Co., Kohler, Wis.
Link-Belt Co., Chicago.
The London Motor Plow Co., Springfield, Ohio.
La Crosse Plow Co., La Crosse, Wis.
Midwest Engine Co., Indianapolis.
Midvale Steel & Ordnance Co., Philadelphia.
A. R. Mosler & Co., Mt. Vernon, N. Y.
Milwaukee Tank Works, Minneapolis.
The Manhattan Rubber Co., Minneapolis.
Miller Traction Tread Co., 1201 Hartford Bldg., Chicago.
The Michigan State Auto School, Detroit.
Monarch Tractor Co., Watertown, Wis.
N. W. Tractor & Truck Dealer, Minneapolis.
The Norma Co. of America, Long Island City, New York.
The New Departure Mfg. Co., Bristol, Conn.
No-Leak-O Piston Ring Co., Baltimore.
W. S. Nott Co., Minneapolis.
National Carbon Co., Inc., Cleveland.
Oliver Chilled Plow Works, South Bend.
Port Huron Engine & Thresher Co., Port Huron, Mich.
Pure Oil Co., Minneapolis.
Parrett Tractor Co., Chicago.
Rowe Mfg. Co., Galesburg, Ills.
Russell Grader Mfg. Co., Minneapolis.
The Simms Magneto Co., East Orange, N. J.
Stromberg Motor Devices Co., Chicago.
Sun Co., Philadelphia.
Splitdorf Electrical Co., Newark, N. J.
Standard Steel & Bearings, Inc., Philadelphia.
Stinson Tractor Co., Superior, Wis.
The Standard Oil Co., Minneapolis.
The Timken Roller Bearing Co., Canton.
Twin City, Co., Minneapolis.
Tractor Wheel Corp. of America, New York.
United Mfg. & Distributing Co., Chicago.
U. S. Rubber Co., New York.
Vortox Mfg. Co., Pomona, Calif.
Vacuum Oil Co., New York.
Whithead & Kales Co., River Rouge, Mich.
Webb Publishing Co., St. Paul.
Waukesha Motor Co., Waukesha, Wis.
Wagner Langemo Co., Minneapolis.
Whitney Tractor Co., Cleveland.
Wheeler Schebler Carbureter Co., Indianapolis.

Program for Power Farming Show

MECHANICS OF THE TRACTOR
—Room 1.—

Tuesday, Feb. 7—
10:00-11:00—Valve timing.
11:00-12:00—Bearings.
2:00- 3:00—Carburetion.
3:00- 4:00—Ignition.

Wednesday, Feb. 8—
10:00-11:00—Lubrication.
11:00-12:00—Slippage lugg equipment.
2:00- 3:00—Overhauling the tractor.
3:00- 4:00—Tractor troubles.

Thursday, Feb. 9—
10:-11:00—Valve timing.
11:00-12:00—Bearings.
2:00- 3:00—Carburetion.
3:00- 4:00—Ignition.

Friday, Feb. 10—
10:00-11:00—Lubrication.
11:00-12:00—Slippage lugg equipment.
2:00- 3:00—Overhauling the tractor.
3:00- 4:00—Tractor troubles.

APPLICATION OF TRACTOR POWER
—Room 2.—

Tuesday, Feb. 7—
10.00-11:00—Plow types, adaptation and use.
11:00-12:00—Plow adjustment, tractor plowing.
2:00- 3:00—Seedbed preparation, tillage tools.
3:00- 4:00—Seeding machinery.

Wednesday, Feb. 8—
10:00-11:00—Belt driven machinery.
11:00-12:00—Cultivators and tractor cultivating.
2:00- 3:00—Harvesting machinery, binder troubles.
3:00- 4:00—Tractor harvesting.

Thursday, Feb. 9—
10:00-11:00—Plow types, adaptation and use.
11:00—12:00—Plow adjustment — tractor plowing.
2:00- 3:00—Seedbed preparation, tillage tools.
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10:00-11:00—Belt driven machinery.
11:00-12:00—Cultivators and tractor cultivating.
2:00- 3:00—Harvesting machinery, binder troubles.
3:00- 4:00—Tractor harvesting.

POWER FARMING PROBLEMS
—Room 3.—

Tuesday, Feb. 7—
10:00-11:00—Farm power.
11:00-12:00—Uses of a tractor.
2:00- 3:00—Tractor farming.
3:00- 4:00—Laying out fields for tractor work.

Wednesday, Feb. 8—
10:00-11:00—Belts and pulleys.
11:00-12:00—Commercial tractor work.
2:00- 3:00—Care of the tractor.
3:00- 4:00—Depreciation and acre cost of farm machinery.

Thursday, Feb. 9—
10:00-11:00—Farm power.
11:00-12:00—Uses of a tractor.
2:00- 3:00—Tractor farming.
3:00- 4:00—Laying out fields for tractor work.

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11:00-12:00—Commercial tractor work.
2:00- 3:00—Care of the tractor.
3:00- 4:00—Depreciation and acre cost of farm machinery.

TRACTOR FORUM

Tuesday, Feb. 7—
11:00-12:00—Cost records for a tractor.
2:00- 3:00—Round table on tractor farming led by practical tractor farmer.

Wednesday, Feb. 9—
11.00-12:00—Motorized farm.
2:00- 3:00—Round table on tractor farming led by practical tractor farmer.

Thursday, Feb. 9—
11:00-12:00—Relation of machinery investment to cost of production. Factors affecting cost of production.
2:00- 3:00—Round table on tractor farming led by practical tractor farmer.

Friday, Feb. 10—
11:00-12:00—Motor trucks on the farm.
2:00- 3:00—Round table on tractor farming led by practical tractor farmer.

FARM DELIVERY CONFERENCE

Washington, Jan. 21—Questions of expediting delivery of farm products through the extension of motor vehicle service from farm-to-market will be one of the topics on the program of the national agricultural conference here beginning Jan 28. Representatives of the automotive industry probably will be named by the Department of Agriculture within a few days to serve as advisors on highway transport. The entire industry will be vitally affected by the outcome of the meetings, as the farmers are the best prospects at the present time.

I. H. C. OPENS PLANT

Milwaukee, Wis., Jan. 23—Encouraged by new orders and better prospects for future business, the International Harvester Co. has resumed the operation of its Milwaukee works, specializing in tractors, farm engines, cream separators, etc. The force is now 1,300, with hopes of increasing this number to 1500 by Feb. 1. The largest number ever employed by the Milwaukee works is 5000.

20,400 TRACTORS IN OHIO

Columbus, Ohio, Jan. 21—C. J. West, Federal and state farm statistician in Ohio, has completed a survey of the state to list the number of farm tractors in use. He reports that the number has been doubled in the past two years. The number two years ago was 10,469 and now the total is about 20,400.

SALES MANAGERS TO MEET

Chicago, Jan .20—The Sales Managers' Department of the National Assn. of Farm Equipment Mfgs. will hold a meeting in Chicago Feb. 15.

Traffic Problems of the Future Which Dealers Must Help to Solve

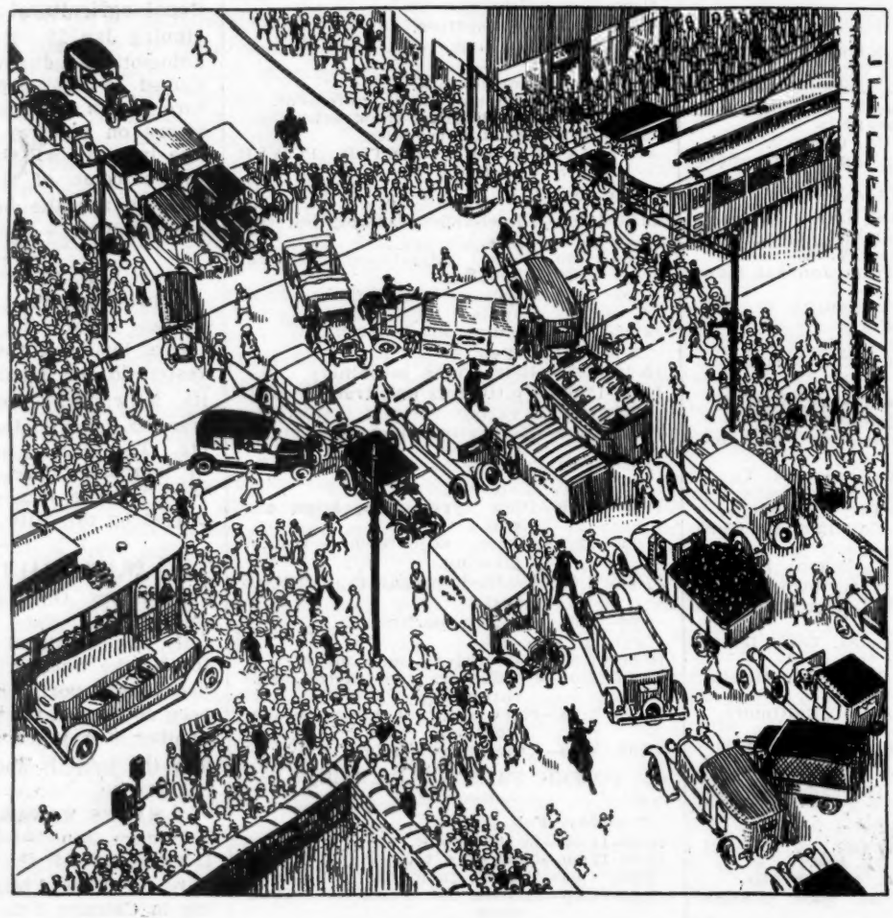
TRAFFIC congestion, lack of parking space and other handicaps to the proper use of automotive vehicles are becoming a serious sales resistant. Dealers, in speaking of service, must not forget this. Being familiar with all phases of the use of automotive vehicles, they should be the leaders in all civic movements for the betterment of traffic

By J. W. INCHES

Paper read before the Highway and Highway Transport Education meeting at Yale University.

PERHAPS it is appropriate that a representative of the city of Detroit should be asked to write something of traffic problems of the future, because to probably no other city on this continent does the subject mean quite as much.

The plan of our city and the fact that we have practically no suburban towns give us a peculiarly acute situation. Detroit had its origin over 300 years ago around the site of a French military camp, which is now an open square in the center of the city and still bears its original name, "Campus Martius." From this camp military roads radiated in various directions, and these roads now are great arteries of travel which converge to a single center.



Detroit's Problem

In every other large city on this continent, half the size of Detroit, thousands of people go to their homes at night on suburban or commuter trains. Some cities have subways and some elevated railways. In Detroit there are no trains carrying people back to their homes in the evening, no subways, no elevateds, and, as a consequence, the entire commercial population of the city must come to its work in the morning and return home at night by street cars or vehicles on the streets, with a resulting congestion between four and six o'clock in the evening that is probably not to be found elsewhere. Then, too, I believe it is true that, being the automobile center of the world, where over 75 per cent of all automobiles are made and where really the life of the city depends upon the success of the automobile industry, it is easier for the agencies charged with the control of traffic to secure the cooperation of leading men and the public generally to study the traffic problems.

In Wayne county, which is practically Detroit, we have 125,000 registered automobiles, with probably 30,000 or 40,000 more continually coming and going from adjacent cities. These machines travel on 1500 miles of streets and 10,000 street intersections.

Traffic Problem a Serious One

To regulate and control the movement of these machines over this territory with uniformed officers is, of course, manifestly impossible, and the fact that regulation must become more and more automatic as traffic congestion increases and the number of men in relation to the problem becomes smaller and smaller, is constantly becoming more evident.

In all large cities the situation is the same — congestion increases — the problem of expediting traffic and yet safeguarding

the public becomes a more serious one, and it is exceedingly opportune that there should be a more concerted study of traffic problems than at the present time in individual police departments and city administrations.

Some of the problems of the future, as we see them in Detroit, can be grouped under four heads:

First: The general control of traffic by trained men who have specialized on that subject.

Second: The education of the general public concerning traffic regulations, safety first, precautionary measures and the duties not only of drivers, but of pedestrians.

Third: The enlargement, wherever possible, and the improvement of the area available for traffic.

Fourth: The use of mechanical devices and signs, directing traffic and keeping continually before both drivers and pedestrians the rules of the road and traffic regulations.

Trained Traffic Men Needed

THE importance of traffic on our city streets has reached a point where it should be handled by a department composed of men giving their entire time and thought to that subject. If it is, it should be in a bureau entirely apart from ordinary police work. While the men who enforce traffic regulations upon the streets will probably always be a part of the regular police force, the study of traffic problems and the making of regulations should be carried on by men who are highly trained and specialize in that subject.

In Detroit, by a happy cooperation of various agencies, we have already secured the benefits of the services of such men. The Detroit Automobile Club, having 15,000 members, owners and drivers of their own cars, including the engineers and scientific men of all our automobile works, is today practically filling the place I feel should be filled by a regular department of the city government. Its board of directors, comprised of men prominent in the automotive world and other leading industries of the city, meets every week for an active discussion of the problems in which its members are interested.

Cooperation Helpful

Between this body and the police department a complete cooperation has existed for the past two years. Every ordinance and every important regulation that is proposed in the traffic bureau of the police department is submitted to it for consideration before adoption. In fact, many important regulations originate at its meetings. Being one of the directors of the club myself, I have come to regard its meetings as a weekly conference at which all traffic matters can be discussed. It will be seen, therefore, that we already have in Detroit the benefits that would accrue from a department of highly trained men.

The Educational Work

I FEEL that, under the head of general education of the public, we are, in Detroit, well ahead of most of our sister cities.

The Detroit police department has a citizen's public safety organization comprised of practically every useful agency that goes to make up an average city. It includes the police department, which has charge of all public safety campaigns, the Board of Education, the Detroit Automobile Club, the Recreation Commission, the Detroit Safety Council, the Detroit fire department and upwards of 200 other important activities and organizations.

The sixth semi-annual campaign opened in Detroit recently, and continued for one week. In the police department we have a permanent accident prevention organization which conducts a continuous campaign, the work of which the larger general organization is intended to supplement and stimulate from time to time. The protection of Detroit's quarter million of children is the main object of these campaigns.

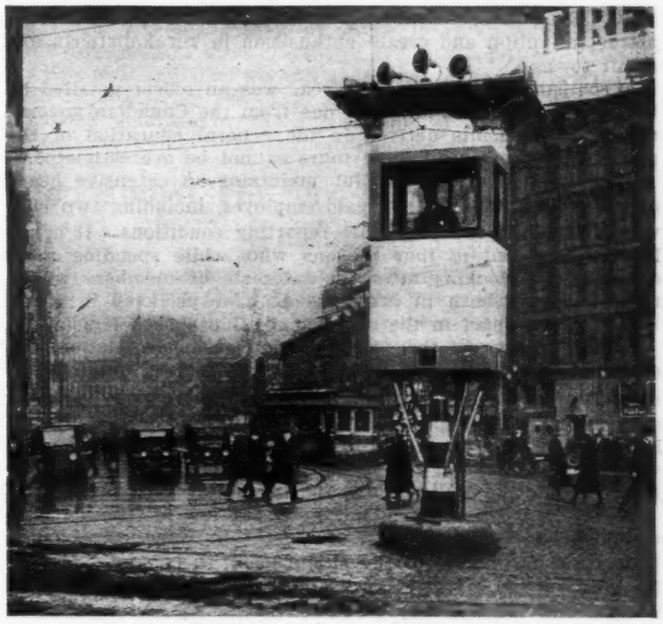
Over 25,000 people had an active part in the recent one, including 5000 school teachers, 1800 members of the police department, over 1000 members of the fire department, the membership of the Detroit Automobile Club, hundreds engaged in individual safety work, comprising the Detroit Safety Council; clergy and teachers in the Detroit churches and Sunday schools; leading merchants; Boy Scouts, Campfire Girls and Girl Scouts; the Federation of Women's Clubs and individual women's clubs; fraternal organizations and various other groups, including business men's clubs.

The judges of the courts join with other city officials in addressing public meetings on this subject on numerous occasions, especially during an intensive drive.

Literature Carries Its Message

In the campaign, over a million booklets and leaflets containing graphic pictures of accidents, warning notices, admonitions and instructions covering traffic laws and safety rules were distributed to homes, through the stores and the industrial plants.

In this way every resident of Detroit has placed before him or her personally some definite article containing a pronouncement against carelessness. Talks are scheduled for the week, including those given by 5000 teachers in the public schools and 2500 in the Catholic and other parochial schools. Meetings are held in industrial plants, in Sunday schools, in practically all the departments of the city, and several hundred are held in the open air. Motion pictures of accidents taken in Detroit will be shown in many of the meetings.



Signal tower used to direct traffic in Detroit. Traffic 1½ miles in each direction is regulated from this tower

A daily parade was held, composed of a police mounted escort, police band, processions of children carrying safety slogan banners, 25 wrecked automobiles, police and fire equipment and various other attractions. Hundreds of large signs are displayed in prominent points throughout the city, calling attention to the purpose of the campaign.

Accidents Lessen During Campaign

These are suspended over the streets and on bridges under which the drivers must pass, and in fact in such places that every person on the streets must see them. At first thought some may think that these methods of creating excitement appear a little on the small town order, but experience has taught us the value of them.

The actual periods of some of the campaigns have shown an almost entire freedom from accidents and they all are followed by a material reduction in loss of life and injury for a short time. There is no doubt that this work has materially aided in bringing about the improved records of the present year, which show that the number of fatal accidents has been reduced to 37 for the first four and one-half months of 1921, as compared with 85 for the same period of last year.

In the past six years over 1000 persons have lost their lives

in accidents upon the streets of Detroit, and we believe that by gradually educating the general public concerning the dangers of street traffic a much better record can be looked for.

The work that is being done in the public schools of Detroit is a part of this campaign and one that should be carried on in every city in the country. Certainly the work of educating the young to a realization of the dangers that lurk on our streets, and of their own duties when they become drivers, should receive universal attention.

Carrying the Work on in the Country

In the future the educational work and safety campaigns carried on in large cities should also be extended throughout the rural districts. The work in Detroit, as carried on by the Detroit Automobile Club, has been applied throughout the entire State of Michigan. In addition to the usual work, which it has done in placing directory signs and painted boards on telegraph poles on nearly 2000 miles of country roads, it has conducted an annual tour covering from 1700 to 2000 miles each year.

This tour last year included in its personnel over 350 men well known in the life of Detroit, and a corps of both national and local speakers. It sets out over the roads of the state like a military organization, carrying a band of music, canvas tents for large meetings and other features calculated to attract attention and create enthusiasm in rural districts and small towns.

Accompanying the tour last year was an officer detailed by the War Department and also one from the Canadian government. The benefits derived in the general education of the people of the state by these tours cannot be overestimated.

The Detroit Automobile Club maintains an extensive headquarters with 27 full-time, paid employes, including two men who continually tour the state reporting conditions. It has a legal department of four persons who, while spending most of their time looking after the interests of members whose machines have been in accidents or mishaps, keep in touch with and take part in the shaping of all proposed legislation.

At the opening of the recent session of the legislation, the club presented a list of 24 subjects of interest not only to motorists but to the general public as well. Most of these suggestions were put in the form of bills and passed by the legislature. On the other hand, a number of bills which were vicious, were opposed and defeated.

Detroit Club and Police Work in Harmony

To the suggestion which might be put forward that a club composed of automobile drivers might in some cases favor legislation prejudicial to the public good, it may be said that in the past two years in not a single instance has there been a difference between the decisions of the Detroit Automobile Club and the Detroit Police Department; and many important measures, such as the drivers licensing law and the certificate of title act are due to the work of the club.

Enlargement and Improvements of Traffic Area

THE enlargement and improvement of areas available for traffic must receive the attention of every large city, and sooner or later the difficult problem of street parking must be resolutely met. In Detroit we are, including the work already finished, under construction and planned for the future, widening 204 streets and opening 53 new ones.

Some of these widenings are of very important thoroughfares, necessitating the removal of millions of dollars' worth of buildings, the estimated cost of a proposed widening of Grand River avenue being around $5,000,000, with the widening of Randolph street, already in the courts, costing $3,000,000. In work of this nature the city proposes to expend, including the work it has already done, something over $25,000,000.

Grade Separation

Under this head may also be considered the subject of grade separation for traffic purposes in cities. Detroit has just completed the construction of a grade separation for traffic purposes only at the crossing of Grand Boulevard and Jefferson avenue, and there is no doubt but that at very heavily congested crossings in many cities grade separation will accomplish much in facilitating traffic. The improvement resulting from the opening of this subway is so satisfactory that it merits more than passing mention.

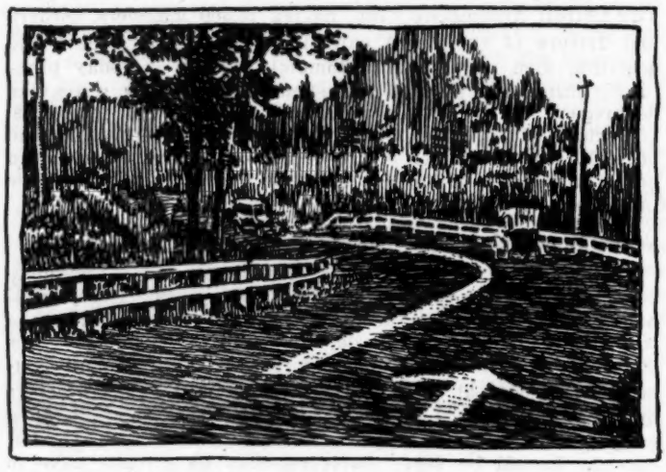
The roadway of the subway is 36 ft. wide between curbs and has a five per cent grade. This width provides for four lines of automobiles. It has a clear height of 12 ft. Each sidewalk has 11 ft. 6 in. clear width and an overhead clearance of 8 ft. 3 in. From these sidewalks ample stairways connect with the sidewalks above.

The roadway of Jefferson avenue is carried over the subway on cantilever, reinforced concrete beams, carried in turn by longitudinal girders supported on columns. A driveway sufficient to accommodate two rows of vehicles is left on either side of the subway on the boulevard, which provides plenty of room for all vehicles desiring to make either right or left hand turns in either direction at the intersection, thus providing for every form of movement usual at crossings.

The parking of automobiles upon city streets presents a problem which must sooner or later be resolutely met and the question definitely decided as to whether or not it is the duty of cities to provide a garage for automobile drivers.

Anti-Parking Rules

In Detroit several years ago a proposal to prohibit parking except for very short periods on Woodward avenue (which is our principal business street) aroused such a storm of opposition that it had to be abandoned after a trial of a few days, with the consequence that there remained a solid line of



White central lines on country road curves have reduced accidents

machines on each side of the street from morning until night, which naturally compelled double parking by people who wished to enter stores upon that street.

Two years ago we carried on an investigation which showed that 75 per cent of the machines which blocked the entrance to every store on the street were owned by business men and others whose places of occupation were on other streets in the financial district, where the streets are narrow, and in some cases five or six blocks away, and that these men parked their cars on Woodward avenue and other retail business streets at any time from 8 to 10 o'clock in the morning and left them there until they left their business in the afternoon; and yet the proposal to abridge that privilege had met with a storm of disapproval.

A year ago last December, facing the Christmas shopping rush, we put into force a no-parking ordinance and, in spite of opposition, maintained it, with the result that we received a testimonial, after the holidays were over, signed by every merchant on the street, thanking us for inaugurating the new regulations.

Obstructing a Residential Street

On the river front of our city and surrounding the approach to our island city park we, unfortunately, have our so-called

Coney Island, or White Way. To this resort, every summer evening and on Sunday afternoons, come thousands of people in their machines, which are parked on the adjacent residential streets for several blocks in solid lines.

Part of this territory is occupied by many of the finer homes of the city, and the police department is in daily receipt of letters asking if there is no way in which a space can be provided through which a man can get, with his own automobile, to his own doorway.

It is practically impossible to handle this situation properly under present conditions, as there are no garage facilities in the vicinity and the people who park there are of a class who drive cheap machines and do not have chauffeurs. The argument is put forward that while the general public may have common rights with merchants on business streets that the owners of residences should, at least, have paramount rights on the streets occupied by them.

It has been suggested that the future may develop municipal garage facilities and the subject will probably receive serious consideration. At present private capital hesitates to invest in large downtown garages because machines are allowed to remain on most streets. If garage facilities, not free but for a proper fee, on a large scale, were provided by municipalities, it might provide a way to prohibit all parking on streets, and, if not a self-sustaining proposition, it might at least save a large amount of money that at present must be expended in the widening of streets.

Picking Out the Violators

In our efforts to enforce parking regulations various solutions have been tried. We maintain a large automobile pound to which many vehicles found improperly parked are towed and the owner or driver, on claiming his machine, must pay $1 for the first offense, $3 for the second and $5 for each subsequent offense.

Supplementing this system and avoiding the trouble and anxiety which was caused to many by finding their machines gone and, in their minds, probably stolen, we have devised a system of attaching a tag to the machine in all parking violations except where the machine is parked in such a manner as to restrict traffic.

These tags direct the owner or driver to appear at the traffic department within 48 hours and pay the same fee as if their machine had been towed to the pound. He is notified on the tag that if he does not appear within 48 hours a complaint will be made against him in court. The stub of the tag which the police officer turns in to headquarters gives the license number of the car, its make and the nature of the violation.

Elevated Sidewalks and Different Traffic Levels

In four months we have attached to cars 12,034 of these tags, resulting in the collection of $15,038 in fees, in addition to the fines imposed in 1612 cases taken into court.

While these and other improvements have accomplished much good, the parking problem remains a most serious one and some further solution of it must be found.

Of course, under this head there will be many problems concerning special traffic streets for one-way traffic, for light or heavy work, for passenger or commercial vehicles, special hours for delivery and other such divisions. We are already constructing pavements with a view to the class of traffic they will carry.

Elevated sidewalks or separate levels for different classes of traffic on business streets are still far in the future. That they will come, and that we will look back upon our present methods of mixing up passenger and freight traffic, slow and fast moving vehicles or those going longer distances with local traffic as being archaic, there is no doubt.

Mechanical Devices for Directing Traffic

THE use of mechanical devices and signs for the direction of traffic has steadily increased and the end is not yet. Perhaps the most notable single improvement which has been tried out in Detroit in the past year has been the so-called block system, by which "stop" and "go" signals are synchronized over long distances, and a uniform and much speedier movement of traffic is secured.

Although Detroit was probably the first city in America to use the semaphore tower at street intersections, New York City was the first to add a system of lights by which signals could be synchronized for long distances. When the adoption of this system in Detroit was first proposed, it was seriously questioned whether or not it could be operated successfully on a street having a very heavy street car traffic, but a try-out of several months has given very happy results.

How Detroit Operates Its Semaphores

Detroit has already improved upon the New York system and now, in addition to the signal towers located a number of blocks apart, there are suspended at every intersection between these towers signal boxes which are controlled by current from the larger towers and which show the same lights, not only to nearby drivers on the same street who may not be able to see the signal towers, but also to drivers approaching on all cross streets.

As an additional aid to drivers, and especially to pedestrians, a small alarm bell at every intersection rings as the light announcing a change of signals is displayed.

The use of some system of this kind, I believe, will become quite general on important thoroughfares carrying heavy traffic.

The use of street signs, which a short time ago was confined to a few types of iron standards, has in Detroit been increased to an almost endless variety, not only of iron standard signs, but of markings and signals on pavements, sidewalks, telephone, telegraph and trolley poles, and in fact almost in every direction where they will catch the eye of the driver or pedestrian.

White Stripes on Pavement

Broad streets and boulevards are marked with wide painted white stripes which designate the space into which drivers

should go when desiring to make a right hand turn at the intersection, go straight ahead or make a left hand turn. Curves on streets are given a wide white stripe showing the center of the pavement around the curve.

Speed limits, warning signals and various other inscriptions with arrows pointing the directions which traffic should take at certain points and many other devices are painted on asphalt pavements.

Illuminated standards with flashlights are placed at certain intersections to enforce rotary traffic, and various other devices, such as the ordinary or illuminated disks, are placed at intersections which, while not interfering with straight-away traffic, serve the purpose of compelling the driver to go to the center of the intersection and slow up when making turns.

The construction of raised safety zones to protect people getting on and off street cars has given satisfactory results, as have experiments with safety isles in the center of wide crossings, and their use will undoubtedly become more general in the future.

One elevated safety zone on Woodward avenue, extending almost the length of the block from the Campus Martius to Gratiot avenue, has handled ten thousand people every weekday for a year between the hours of 4:30 and 6:00 p.m. without a single accident. This platform is 216 feet long, 5 feet wide and 7½ inches high, and has never given evidence of restricting traffic in any way. Many people use this zone rather than go to more convenient safety zones which are not elevated.

The Accident Investigation Bureau

Among progressive steps that we have taken in Detroit and which, I think, will play a part in the future problems of traffic should be mentioned an accident investigation bureau which was established a year ago. It is comprised of 20 trained investigators under the direction of two lieutenants of the detective bureau.

These men thoroughly investigate all traffic accidents, giving special attention to those in which any person is killed or injured. When evidence of carelessness on the part of the operator of a vehicle is discovered, he is taken to court on a suitable charge. The officers proceed in these cases the same as is done in connection with criminal matters.

Formerly only the accidents witnessed by police officers were taken to court, excepting those in which the victim was killed. The result was that about 95 per cent of street traffic accidents were settled out of court, chiefly by accident insurance companies.

Since this bureau began to function, public welfare has been regarded as being paramount to the private interests of the individuals, and the police department disregards the civil phase of such cases and prosecutes the case entirely from a standpoint of the best interests of the public.

Formerly these cases were assigned to detectives and other police officers who were already busy working on criminal cases and other general duties. It was found necessary to assign men to perform this specific work, devoting their whole time to it. The result has been that so far this year over 250 persons have been convicted in court who, under the former method of procedure, would merely have referred the matter to the insurance companies.

Laboratory for Testing Headlights

A complete light laboratory, housed in a building 125 ft. long by 40 ft. wide, has been established, in which the public is given free service in the testing and adjusting of headlights and dimmers in accordance with the ordinances of the city.

To sum up, I would include among the future problems of traffic: a department in both state and large city governments of specialized men who have been trained for their work; the maintenance by such a department of a continued campaign of education in large cities, which will be supplemented by the work of a powerful organization, either city or state, not only supporting the city governments, but extending its propaganda to rural communities, creating such public sentiment as will secure proper legislation in traffic regulation and road construction; the widening of streets or other enlargement of the space available for traffic, and some solution of the park problem; and the further development of street devices which will in any way facilitate traffic or assist in its automatic regulation.

Along these lines, a progressive city or state government should accomplish much.

d'Humy Ramp System in Practice in Poughkeepsie Garage

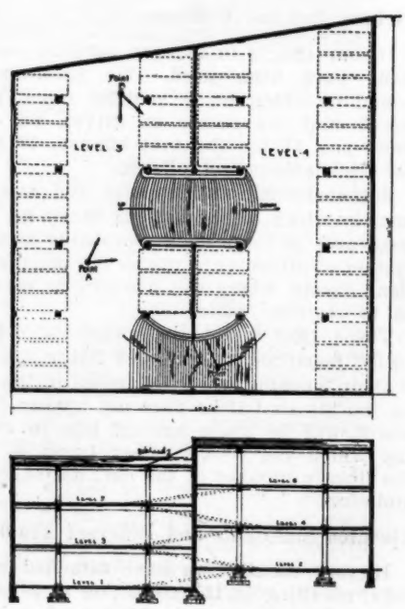
The ramps in this system are short, having to rise only 5 or 6 ft., depending on the height of ceilings

THE Nelson House Garage, recently opened in Poughkeepsie, N. Y., is the first building in the country to incorporate the d'Humy Motoramp System, and the features of the building are based on the principles of this patented construction.

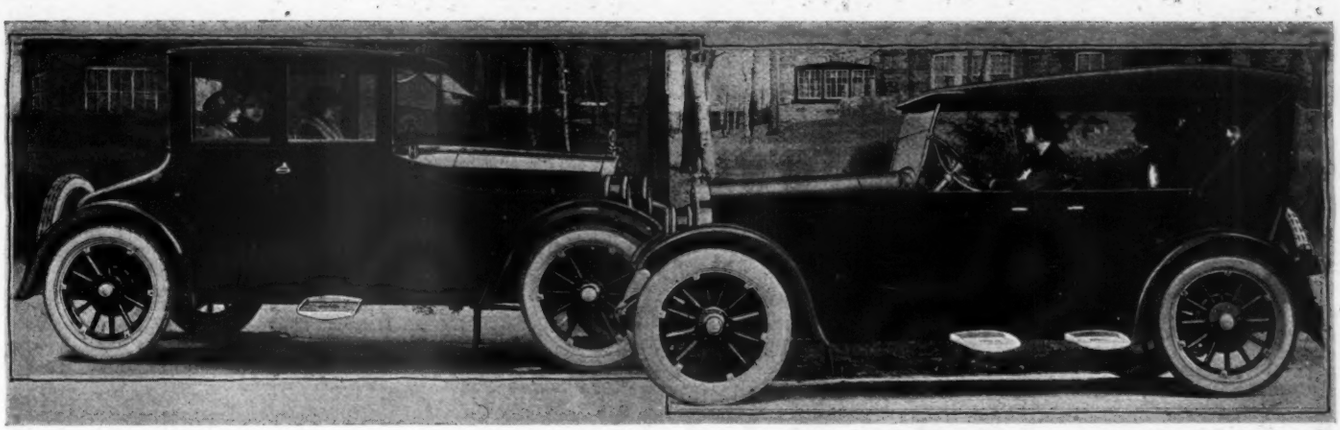
The building is a three-story structure, and is divided vertically in the center, the floors in one half being placed midway between the floors in the other half, as shown in the sectional view. By this simple modification, ramps half the usual length may be used to connect the various floors a half story apart. And these short ramps are so arranged that they permit continuous travel up or down through the building.

Because these ramps are half length, they are short enough to be employed as connecting passages between the main car storage aisles.

In the Nelson House Garage, the ramps are about seven feet wider than necessary, for one way traffic, and consequently the building does not give the high storage capacity that is usual in buildings equipped with this system.



The points A and B are the locations from which the photos on the opposite side were taken



Cleveland coupe and touring car, showing the aluminum steps which now are fitted in place of running boards

Cleveland Six Has Changes in Engine

THE Cleveland Six has a number of mechanical refinements, most of which are confined to the power-plant. The mushroom type of valve lifters have been eliminated and a new roller type installed. Double springs are now used on the valves to reduce noise and periodic vibration. The period of vibration of the larger spring is different from the smaller with the result that the valves are not held open at high engine speeds by vibrating springs.

The oil filler has been moved from the chain case to a more accessible location on the crankcase and the oil drain has been rearranged so that it is possible to completely drain the crankcase by merely turning a small lever, a feature especially appealing to the service man. Bosch ignition, lighting and starting equipment is now regularly furnished.

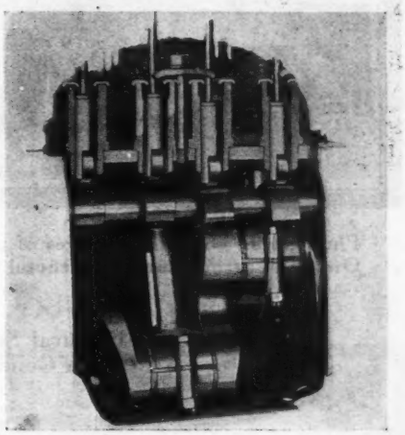
Detail Body Changes

The principle change in body design is the offering of aluminum steps as standard equipment on all models, running boards being optional. The fenders and headlamps have been changed to the drum type. The radiator shell is nickle plated. A moto-meter is now standard equipment.

While the body models in general are very much the same as formerly, several detailed changes have been made in the individual bodies. The roadster has a large opening in the deck at the rear in addition to the carrying space immediately in back of the seat. A new type of top with gypsy curtains and new bows has been fitted to all open models.

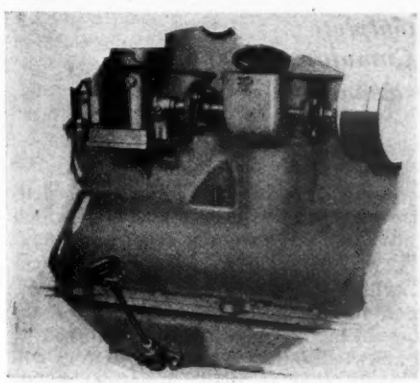
Outside of the few refinements on the power plant the later remains substantially the same. It is a valve-in-head type, bore 3 inches, stroke 4½, with cylinders cast enbloc separate from the crankcase. One of the features on the valve system is the lubrication of the rocker arm. Oil flows from a cup to wicking in the rocker arm shaft and is then distributed by centrifugal force through an oil groove in rocker arms to a felt washer on the ball adjusting screw which absorbs the oil and insures positive lubrication of the push rod socket end.

The intake in exhaust valve seats are cast sufficiently far apart to allow water to circulate around the entire valve seat, naturally this prevents valve distortion and burning valves at high engine speeds. Valve grinding is also greatly reduced. The combustion chamber is machined all over and thereby greatly reduces the chance for carbon to adhere to the surfaces.



Roller type cam followers now installed in Cleveland in place of mushroom tappets

The chassis has for further units a unit type gearset, propellor shaft fitted with double universal joints, floating rear axle, semi elliptic springs, worm insector type steering gear, propellor shaft brake and wood wheels, the later carrying tires 32x4 inches. These are Goodyear cords. The wheel base is 112 inches.



The accessible oil drain and filler on the Cleveland

White Co. Building Special Type of Motor Bus

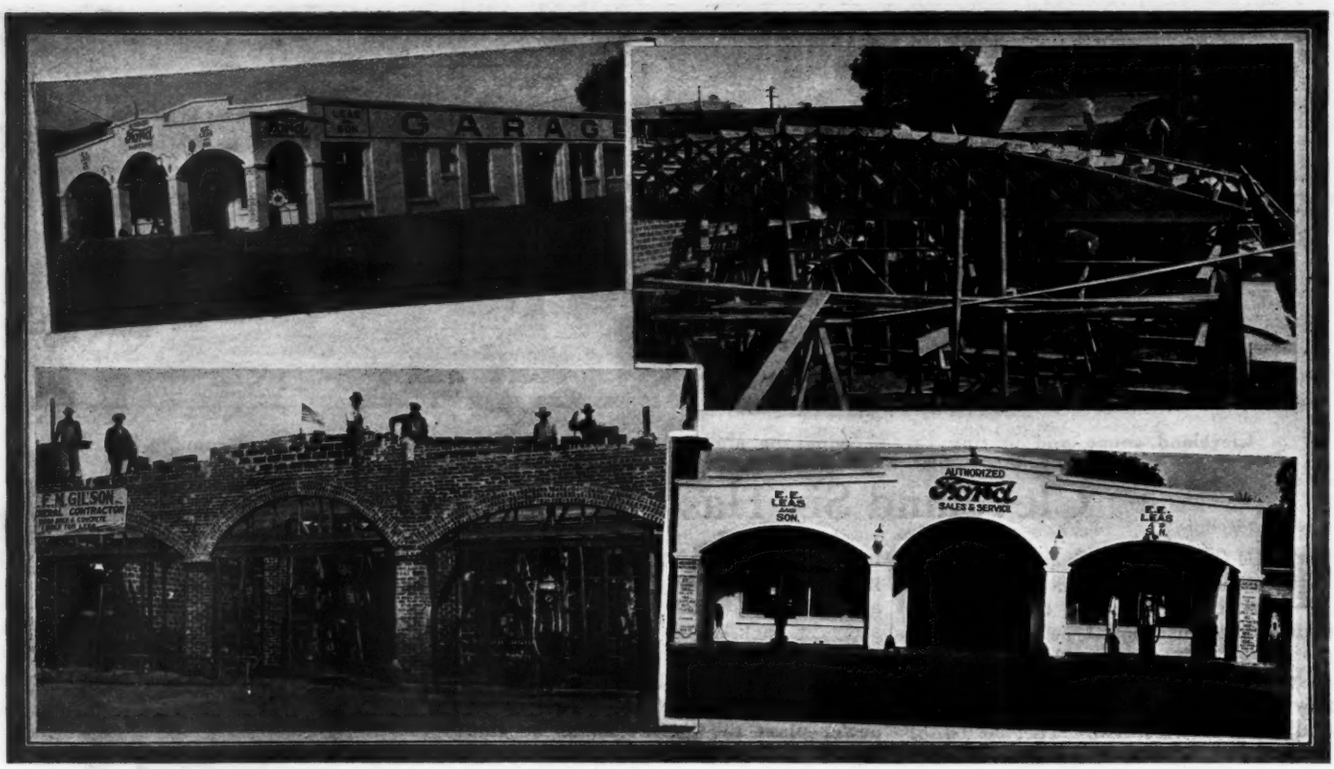
THE White Co. has a special type of motor bus having new features of design which are important in passenger transportation.

The new White bus chassis is listed at $4,400, this price including frame braces and standard equipment. Bodies cost extra.

The Model 45 engine, 4¼ by 5¾ in. is used. Other specifications include a 198-in. wheelbase, four-speed gearset and metal wheels mounted with solid tires. Disk wheels with penumatic tires may be used at an extra cost of $250. The latter equipment includes one extra wheel. Dual rear wheels are used with both solids and pneumatics. The solid tire sizes are as follows: Front, 36 by 4 inches; rear 36 by 4 inches for dual and 36 by 7 inches for single wheels. The pneumatic tire sizes are 36 by 6 inches all around.

Two types of bus bodies have been designed for this chassis—one known as a city type and the other an interurban type. Operating companies, however, may use other types of bodies when desired.

Standard equipment includes generator and electric lights. The use of various optional standard gear ratios make possible a wide range of speed and acceleration.



Photographs show three stages of progress in the erection of a garage, sales and service station for Leas & Son, Oakland, Ore. The architecture and general layout was planned by Motor Age in compliance with a request for advice. The letter on the next page gives full details of its construction

Architectural Suggestion Submitted by MOTOR AGE for the Above Building. A Plan for General Layout Was Also Developed, But Is Not Here Reproduced

Building Advisory Service and How It Works Out in Practice

What Are Your Building Problems? If You Contemplate Erecting or Remodeling, Take Advantage of the Cumulative Experience of Thousands of Dealers and Garagemen by Asking MOTOR AGE for Help

MANY of those wishing to build are more or less at sea concerning some of the simpler laws governing the most efficient housing of automotive activities, whether they run to the line of service, car sales, accessory sales or storage.

If the prospective builder is in doubt as to the best way of doing things he cannot get very much help from his architect because the architect knows less than he does. The architect can work out the details and draw up specifications that will produce a good building architecturally, but it may be ill-adapted to the branch of the automotive business for which it is intended. Unless there is someone to direct the architect and help in getting a practical layout, he must necessarily take a lot of his own time learning the garage business, which, of course, he does not care to do and does not receive adequate pay for doing.

This practical layout, which the owner is not always competent to make and which the architect has not acquired the knowledge to make can, in many instances, be referred to MOTOR AGE with the full knowledge that a persistent effort will be made to produce a layout that is really practical. This layout will also be practical architecturally, so that the architect will not be obliged to perform constructional gymnastics in order to build from it.

It may be seen from the accompanying letter and photographs that the firm of Leas & Son, of Oakland, Ore., has been very well satisfied with the suggestions made by MOTOR AGE. They sent out a call for help in November, 1920, and MOTOR AGE sent them suggestions in December.

This is a good example of the building planning service rendered by MOTOR AGE to its readers, and scores of clients have testified to its value. Many take our plans direct to a contractor without consulting an architect, but we do not recommend this, as contractors have not always the education and knowledge to plan construction details except on the smaller class of buildings.

It is a fact that there are some clever builders among contractors, and if you know such a one you are all right. As a rule the architect-designed building is better designed, more harmonious, more complete, less inclined to be botchy and, altogether, is a much more ship-shape looking job throughout; if one cares for style and good taste, he should by all means employ the best architect he can get.

The best procedure is to study the situation thoroughly first to determine as near as possible what is desired, then call on MOTOR AGE, and when you get the layout to suit turn it over to the architect for details and perfections. If this procedure doesn't work out, it "can't be done."

How the Garage on the Opposite Page Was Planned

Oakland, Ore., Dec. 6, 1921.

MOTOR AGE,
Chicago, Ill.

Gentlemen—Some time ago we sent your building department a pencil sketch of a garage we contemplated building. You ably sketched us a plan which we adhered to closely in building. Some mistake in measurements led you to think the sidewalk was seven feet wide, whereas it is 10 feet, which allowed us ample room for a row of four piers 22 feet square. These piers are of brick filled with concrete for stiffness to carry front arches, which are also of brick.

The rest of the building is of hollow tile with reinforced concrete lintel extending all the way around the building over the windows and door openings. This is 8 by 14 in. dimensions, reinforced with ⅜ in. coat of cement plaster, with an additional dash coat of white cement.

The roof is carried on eight built-up lattice trusses with a 5 ft. 10 in. rise in the center. All piers carrying trusses are of brick poured with concrete filler. Large plate glass windows are in front and on the south side, while in the rear and side along the shop, the entire space between pillars is filled with sash of 12 by 14 in. double strength glass, upper halves of sash pivoting in center for ventilation. Space 38 by 40 ft. is partitioned off southwest corner, which has office, accessory room, ladies' rest room and a 7 by 9 ft. vault, where stock of tires and records are carried. This portion of garage is finished. Sides and ceiling in hard plaster.

We went contrary to your advice by building on south side of office, between two large plate glass windows, a clinker brick fireplace, which has proven to be one of the largest drawing cards of our garage, partly from the cheerfulness it imparts and partly from the novelty of a fireplace in a garage.

A space 38 by 50 ft. is partitioned off of the east end of building, which is used for a workshop. An unusually light shop is afforded by almost solid glass on two sides. We were also much worried at first about the oil situation, but we took care of this in three of the four columns in front by inserting 14 by 16 by 18 in. heavy galvanized boxes in the columns with hinged doors flush with outside of column.

To these are connected two ¾ in. down pipes which are carried through between the rafters of the building, over the sidewalk to a platform between two of the main building trusses, which carries six steel tanks, this giving us six grades of oil, delivered by gravity, right on the curb by our gasoline pumps. Oil is emptied into these tanks from drums by air pressure.

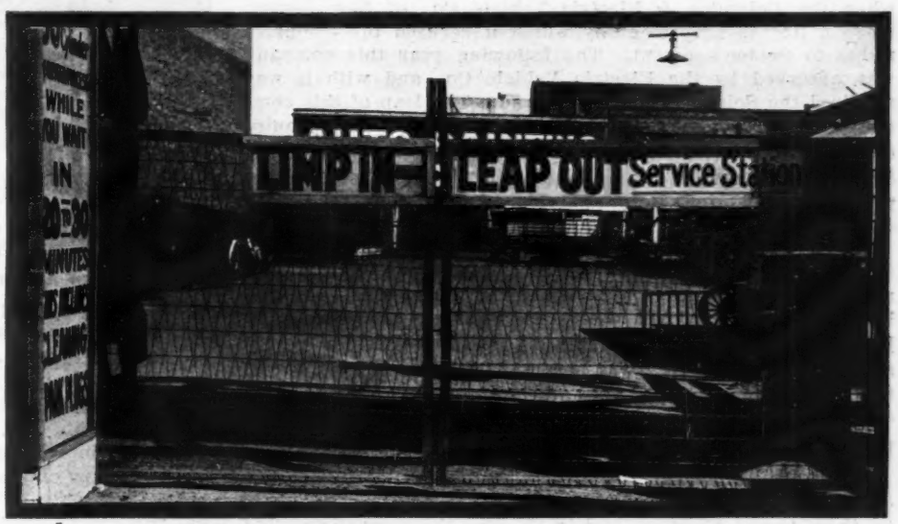
We hope in a short time to furnish photographs of the interior of our office and accessory room. We have heard nothing but favorable comments on the general outlines of the building and, as this is due you, have passed you the credit. One other item we might mention is that of a steel latticed door instead of the conventional wooden doors. This slides on a steel track, collapsing in the width of the pier by the side of the entrance. In many places this would not be at all practical, but, due to our mild climate and absence of wind, it suits our case very well. We take especial pains to keep everything as clean and orderly as in a well-appointed office or home, and our efforts so far have been rewarded by a constantly increasing trade.

Again we thank you for your very able design and suggestions, and enclosed you will find photographs of our garage.

We might add that the approximate cost of our building is $11,000.

Very truly yours,
LEAS & SON,
E. E. Leas, Mgr.

Novel Sign Promises to Put Pep Into the Tired Car



AN enterprising automobile man in San Francisco saw the money-making possibilities in a parking station specializing in the removal of carbon from cylinders. He rented a vacant lot and then, to attract attention, he hit upon the clever idea of a sign reading, "Limp In—Leap Out" service station.

The owner of this service station says the average motorist will neglect having the carbon removed from the cylinders of his car until the engine almost refuses to run. He needs a jolt to remind him of the necessity of having this work done. This service appeals to the motorist on his way to work and he can leave his car during the day and get it back in time at night to drive home with it rejuvenated. This plan has been found to work successfully.

NEXT WEEK—FEBRUARY 2

The ANNUAL SHOW ISSUE and SPECIFICATION NUMBER of MOTOR AGE

Death of Selden Recalls Patent Litigation Of Years Ago

Inventor of First Gasoline Propelled Vehicle, Who Died at Rochester Home, Had Romantic Career But Reaped Only Small Benefit From Inventions

GEORGE BALDWIN SELDEN, inventor of the first gasoline-propelled vehicle, died at his home in Rochester, N. Y., Jan. 17, aged 77 years. He was a pioneer in the manufacturing of automobiles and at the time of his death was president of the Selden Motor Co.

SELDEN'S name will stand out in automotive history chiefly through the long controversy which raged in the courts about his claim of a basic patent on the automobile as a whole, which affected practically every manufacturer of a decade ago and which finally terminated with an adverse decision directed against him and in favor of Henry Ford, the only manufacturer who refused to acknowledge the claim and against whom he brought a test suit.

The Selden patent was first applied for on May 8, 1879, with the filing of a claim on a self-propelled gasoline vehicle. The patent was not issued until Nov. 5, 1895, because in the interval the public was so obsessed with the electrical delusion that it was impossible to make any progress with a gasoline vehicle.

The real start of the patent litigation was made in 1899, when the Columbia & Electric Vehicle Co., of New Jersey, made a license agreement by which it secured the exclusive rights to Selden's patent. The following year this company was absorbed by the Electric Vehicle Co., and with it was acquired the Selden license agreement. The leap of this company to the front as the most powerful element in the automobile field was marked by the vigorous enforcement of the Selden patent and a complaint alleging infringement on the part of the Winton Motor Carriage Co., of Cleveland, was drawn up and filed.

The patent was sustained in general terms by the United States District Court The suit was carried along, taking testimony from 1900 until 1903, when a movement was instituted by George H. Day and others to form the Association of Licensed Automobile Manufacturers, with the Selden patent as its foundation. This was accomplished March 5, 1903, and the Winton company and nine others signed the agreement as charter members.

Royalty Agreement Reached

Under the agreement, the licensed companies agreed to pay as royalty 1¼ per cent of the retail list price of all cars sold by them to the Electric Vehicle Co. and the company agreed to pay two-fifths of the sum to the Association of Licensed Automobile Mfgs.

As the popularity of the automobile increased the royalties became so large that they proved burdensome to the industry and long before the annual output of licensed cars passed the total of $100,000,000 a year a supplemental agreement had been reached under which only $150,000 annually was paid to the Electric Vehicle Co. and the remainder was placed in the general fund of the association. No public statement ever has been made with reference to the total royalties paid by the manufacturers on account of the Selden patent. It is probable that the inventor received all told not far from $200,000 gross.

The litigation between Selden and Ford is regarded as one of the most spectacular chapters of automobile history. The original suit was filed on Oct. 21, 1903, against C. A. Duerr & Co., New York agents of the Ford Motor Co. John Wanamaker, O. J. Gude and Panhard & Levassor later were made defendants. The action was brought at the request of the A. L. A. M. in the name of the Electric Vehicle Co. and Selden in the southern district of New York.

George Baldwin Selden in the original gasoline propelled vehicle

Legal Battles Accompany Suit

There was an impressive array of legal talent on each side and never was a patent suit tried more exhaustively. The record of testimony was 36 large volumes, and Judge Charles W. Hough declared in his opinion on the case that more than half of this testimony was utterly worthless. As a consequence of this suit, the present simplified equity rules were laid down by the Supreme Court of the United States.

The taking of testimony began after the complainants had proved the patent. In the meantime an automobile embodying the claims of the patent had been constructed to prove that it would run. Among the witnesses for the complainants was Dugald Clerk, a British engineer considered the highest authority on the gasoline engine. The defense called, among others, Charles E. Duryea, the American pioneer. It is reported that when Duryea read a copy of the Selden patent soon after it was issued in 1895 he said:

"Why, this patent covers only the Brayton type of motor."

From the viewpoint of the highest court, his opinion was correct, although it was voiced 16 years before the court handed down its opinion.

The opinion of Judge Hough, rendered in Sept., 1909, sustained the patent in every particular; declared Selden the pioneer, and granted the complainants an injunction and accounting. The result of this decision was to strengthen the A. L. A. M., but Ford soon took steps to protect the users of his cars by taking an appeal from the decision and depositing a bond to cover the damages of the complainants.

While the appeal was pending, the Ford company laid the

foundations for the tremendous increase in its business which has developed since that time.

The opinion of the Circuit Court of Appeals was written by Judge Noyes. He found that the patent had been held in the patent office for 16 years after application for it had been filed. He had ample evidence that the patent possessed novelty and invention, but he also had evidence that the motor-propelled road vehicle was not new and that the gasoline engine was not new.

"Ford Did Not Infringe"

The opinion of Judge Noyes, which was handed down during the National automobile show in New York in 1911 held that the patent was valid but that Ford did not infringe because the patent described an engine of the Brayton type while all the defendants and almost all the modern automobile makers used the engine of the Otto type to which Selden had referred contemptuously in his diary as "another of those damned Dutch engines." The complainants decided not to carry the case to the United States supreme court.

The decision removed the chief purpose of the A. L. A. M. which at that time included the makers of ninety per cent of American automobiles, but there was no way for the members to withdraw during the life of the patent and it proved such a powerful constructive influence that it could not be abandoned and it was reorganized as the National Automobile Chamber of Commerce. The decision, however, put an end to Selden's royalties. If his patent had been sustained and he had continued to receive a gross royalty of one-fifth of one per cent on the cars made up to Nov. 5, 1912, which was the date upon which the patent would have expired, his receipts would have made him many times a millionaire.

In spite of his gruffness and aloofness toward his neighbors, Selden always was warmly interested in his home city and in the automotive industry. In his later years, at least, Rochester has held that Selden should be given credit for conceiving the idea of the automobile as it has developed in America. It always has contended that he was entitled to the credit of having built the first "horseless carriage" used in this country in spite of the claims of the Appersons and Haynes.

Begins Experiments in 1865

Selden first became interested in the idea of a self-propelled vehicle for common roads when he was a boy. He heard his father and D. S. Morgan, of Brockport, N. Y., a manufacturer of agricultural implements, discuss the subject and both of them believed that it would be impossible to use a road vehicle driven by its own power.

Later Selden entered Yale University. This was in 1865 and when he was at New Haven he tried to get some information on the subject from the college library From that time on he conducted experiment after experiment and concocted device after device, all bearing directly or indirectly on the subject of a self-propelled vehicle. In 1869 he filed an application for a patent on a hard rubber tire, the first of the type now generally in use.

By the year 1873 he was convinced that the self-propelled steam vehicle for common roads was not satisfactory and bent his efforts to ascertain if a practical traction device could be built which would afford sufficient adhesion after the weight had been reduced, which necessarily decreased the adhesion between the driving wheels and the road. Thus, he arrived at the fundamental proposition on which all modern road locomotion depends—reduecd weight relative to power.

From that time on he worked away in his spare hours. His time was necessarily limited, because he was a patent attorney.

The real idea, Selden said, came to him in 1877, and in 1878 his three-cylinder engine was shown to a number of Rochester men. He made all sorts of efforts to interest men to aid him in manufacturing his engine and putting a road vehicle upon the market. None of them, however, wished to venture capital in what they evidently looked upon as a wild-cat scheme.

Sends "Horseless Carriage" to Washington

At length the horseless carriage was made and sent to Washington. Photographs of the model carriage are familiar to all who have followed the development of the automobile, and it shows fairly accurately just what Selden was aiming to do and finally did do. After his application was filed, the electrical craze swept the country and inventors discarded the idea of a gasoline engine. Selden had tried his engine out on rollers on the floor and knew that his was practical, but did not mount it on a carriage.

"Why," he said, "if I had put that engine on wheels and driven down Main street in it those days, there isn't a doubt in the world that I would have been confined to the insane asylum."

The electric craze passed. German and French manufacturers had begun to return again to the idea of the gasoline car, and at length Carl Benz, of Mannheim, perfected his first car. Selden took his original engine and mounted it on a carriage that corresponded exactly with the specifications in his application for a patent.

The engine weighed less than 400 pounds, and it developed three horsepower. The whole buggy weighed about 1000 pounds and carried two passengers. It was assembled and was given a trial trip on a New Jersey race track, where it made a mile in six minutes.

Later the same car became a familiar sight around Rochester, and it is still in existence.

A Crane for Truck or Trailer Mounting

A LIGHT crane that can be mounted on motor truck or trailer, can get from job to job economically and at motor truck speed and can do a great deal more work per day than the more cumbersome, slow-moving types.

Stirrups from the crane frame hang constantly under the rear axle with cushion blocks to take road shocks, and a small jack screw on each side of the crane screws down quickly by hand to rest on the truck spring over the axle. This prevents the crane from rocking on the truck springs during operation.

The crane is a high-speed, full-rotating compact unit driven by its own heavy duty gasoline engine, with large reserve power. It handles a ½-yard grab bucket or 36-in. magnet and a generator for exciting the magnet can be attached.

Made by the Universal Crane Co., Swetland Building, Cleveland.

How a Dealers' Association Has Worked Out a

Scale of Used Car Allowances

to Be Adhered to By Its Members

Cars Are Put in Good Running Condition and Are Backed By the Association Guarantee—Cost of Rebuilding and Overhead Expense Must Be Considered in Arriving at Trade-in Allowance

THE Hartford (Conn.) Automobile Dealers' Assn., after having had more trouble last year than ever before with the used car, definitely decided that "something must be done." Dealers on all sides had lost money, so the association at a meeting decided to appoint a permanent committee of five men to meet every week at luncheon and receive the week's problems for discussion and a possible solution. This plan was generally accepted. The committee drew up a plan which was accepted by a vote of 40 to 2. The two dissenters hearkened to their factories, though actually they personally favored the plan.

THE Hartford committee met the Springfield delegation and one from Worcester. Worcester and Springfield manifested a fondness for the Hartford plan and adoption is certain. Furthermore, the three associations are to issue a trade book of prices jointly and the figures of allowance therein contained will prevail.

This is the idea: there is a fixed allowance for all cars and no member of the dealers' association will go above that allowance under pain of displeasure from the rest of the members, which will be manifested in most tangible form.

Briefly, the aim of the dealers' association is to stabilize and improve the used car market and sell every used car under an association guarantee.

Every car sold is to be put in the best running condition. It is desired to retain control of the used car market and keep that control as far as possible in the dealers' hands.

The allowances decided upon which follow hereinafter are maximum, and all dealers are urged by the committee to bear in mind that there are such things as sales expense, overhead and so on. These must of necessity be considered in making a sale.

The price derived from the sale of a used car should cover the amount allowed plus the cost of conditioning the car and at least 10 per cent of the allowance for sales expense. The following prices are figured on the basis of 40 per cent off the current model price, that is to say, the latest factory list price, to cover normal depreciation, less 10 per cent for conditioning and less 10 per cent more for selling expense and profit as follows:

1921 factory list price, less 40 per cent depreciation, less 10 per cent conditioning, less 10 per cent profit, equals the maximum allowance price for 1921 models.

1920 maximum allowance equals 1921 maximum allowance less less 20 per cent.

1919 maximum allowance equals 1920 maximum allowance less 20 per cent.

1918 maximum allowance equals 1919 maximum allowance less 25 per cent.

1917 maximum allowance equals 1918 maximum allowance less 30 per cent.

1916 maximum allowance equals 1917 maximum allowance less 30 per cent.

On cars older than five years the dealer furnishes a net allowance price. The rule works as follows: Multiply all current prices for 1921, whether the car is called a 1922 or a 1921 by 48.6 per cent for 1921.

Multiply the same price by 38.9 per cent for 1920.

Multiply the same price by 31.1 per cent for 1919.

Multiply the same price by 23.3 per cent for 1918.

Multiply the same price by 16.3 per cent for 1917.

Multiply the same price by 11.4 per cent for 1916.

Every member of the association files with the secretary a list with prices for the various models of the make handled. The allowances are figured according to the above rule and every dealer in the association knows just what those allowances are. And he always has the used car committee or the secretary to fall back on if he requires help. An inventory of used cars in stock is filed at each weekly meeting.

The committee sees to it that each member gets the inventory of the association. The committee has power to act on such special cases as may come up from time to time. Their decision is subject to appeal to the board of governors.

Arrangement for Trading Allowance

If a dealer has a trading allowance from his factory or is willing to cut off his list price for his own reasons or desires to sell quickly certain models that may soon become obsolete he is at once to advise the used car committee and the association of the amount of cut or allowance, though he need not explain his reason. When such dealer handles trades, he should quote only regular allowance figures, the object being to put everybody on an even basis and not give the public the wrong impression as to the value of the second-hand car.

When a customer has a practically new car or one that has been recently conditioned (rebuilt or overhauled) or there is some special condition in which the customer is not satisfied to accept the appraisal, it is understood that any concern handling the deal is to sell the car for the owner, charging him 10 per cent of the appraised price. Regular allowances are not to be exceeded when the deal includes trading in a second-hand car on a second-hand car.

The association is to furnish appraisal prices on all makes of cars sold on Hartford or offered in trade on new cars where the prices have not been submitted.

Every member pledges his assistance to his fellow dealers. On cars older than five years dealers must submit net allowance prices on both open and enclosed models by years for at least two years.

That this plan is fair is obvious. Every dealer sets forth just what he allows for his cars for five years back, and every other dealer has the same list. Provision is made for revision of appraisal prices.

Fines for Infraction of Rules

For non-attendance at weekly meetings a fine of $5 is imposed for each offense. Any dealer absent for three consecutive meetings is fined an additional $25.

For violation of rules on allowance, a maximum penalty of suspension may be imposed. The dealer may be reinstated by paying the accrued fines and penalties. Reinstatement requires a two-thirds vote of the entire association.

Now, then, this lays the cards on the table face up. Every member of the association has pledged himself, that is to say, 40 dealers have. Now, then, assume for the sake of argument that the dissenting dealer allows more than the schedule calls for, what then? Merely this, the association members as a body will go out of their way to trade in cars of the make handled by the dissenting dealer and exceed any allowance he can make. In other words, as a member of the association he must play in the association's yard and by the association's prescribed methods.

It follows that with this plan in force those Hartfordites who have been in the habit of lying about what the other fellow offered are up against a tough proposition. Someone is going to sell that prospect if he buys at all, but which ever members gets the business allows no more than any other member would allow.

The Hartford Automobile Dealers' Assn. does not feel in the least arbitrary about the matter, merely a desire to have the public realize that old cars must be conditioned and that the dealers are entitled to a profit for conditioning and sale.

The association desires the confidence of the public and appreciation of the car buyers that the organization is an institution founded on sound business principles.

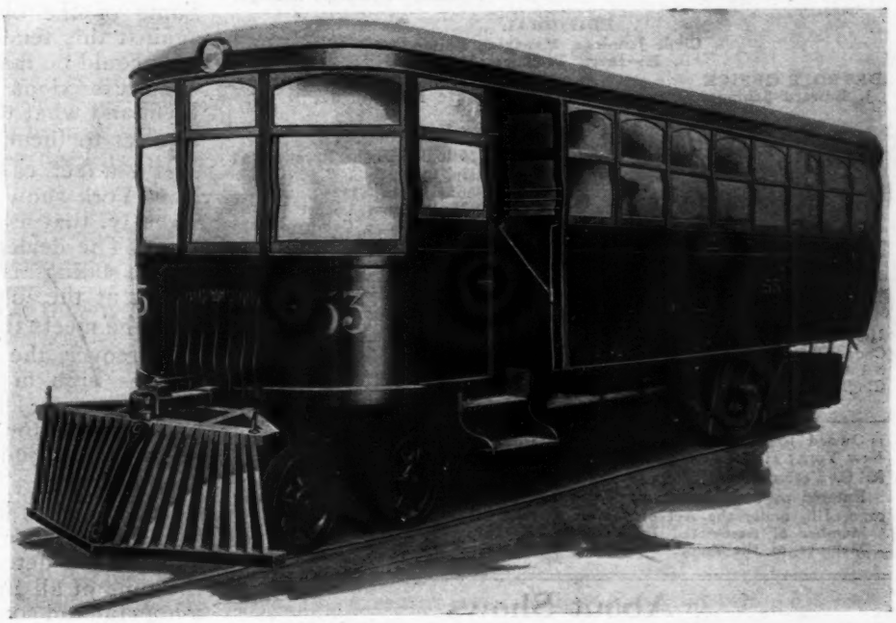
Automotive Rail Car Developed by Duplex Truck Co.

IN an effort to assist railroads and traction lines to more profitably operate on their short-haul spurs or less frequented sections of their longer lines, the Duplex Track Co., Lansing, Mich., has recently put on the market an automotive rail car.

The special Duplex power unit contained in this car comprises the same type engine used in the Duplex motor buses. It has been designed and built especially for rail operation where heavy duty and constant service is employed.

Brakes have been provided on all four of the front wheels as well as on the rear wheels acting through equalizers which apply the force equally under pressure.

The entire mechanism is operated by one man stationed in the right front compartment of the car, where all controlling levers are within reach and from which point, if desired, the car can be operated by only one man.



Special Body Designs

Seating accommodations are provided for 32 adult passengers. The majority of the seats are arranged transversely, the only longitudinal seats being one in front near the service door on the right and one on either side over the rear axle.

The seats, floor mat strips, ventilators and many other details conform to construction standards of steam and electric cars. Current is supplied by a storage battery used for illuminating purposes only. A separate battery supplies power for the starting motor.

Special types of bodies are designed to conform to local requirements of traffic for each particular installation. These include combination passenger and baggage cars, with accommodations for 21, 26 and 29 seated passengers, having a baggage compartment of from 4 ft. 6 in. to 6 ft. 6in. in length; combination passenger and freight cars, with accommodations for 21 seated passengers in the closed body with a 7 ft. 3 in. platform with stake sides for hauling freight, and a combination baggage, express and mail car with suitable compartment for partitions ,including a separate one for the operator.

High Rate Discharge Tester for the Battery Service Station

DELAY and annoyance in the battery service station can be avoided by the use of a high rate discharge tester which, applied intelligently to the discharged battery, will tell not only that the battery is really in need of a charge but will at the same time show the condition of the cells and whether they are shorted or not.

To make the high rate discharge test, the battery is connected to the heavy cables and the rheostat adjusted to draw about 150 amp., assuming the battery is capable of giving out this much current. Then, while the current is flowing, the test points are applied to the cells, one at a time, and the voltage of each cell is observed.

With a good battery in a charged condition, the readings will be from 1.5 to 1.8 volts per cell, while with a good battery in a discharged condition, the readings will be from .8 to 1 volt per cell.

If any cell is defective or shorted, due to rotted separators, buckled plates, or a combination of the two troubles, the condition will be instantly detected, for the cell in question will either show a lower reading than the others, which reading will rapidly drop off, or it will show practically no reading, or it may show a reading in the wrong direction.

This reversed reading obtained from a shorted cell is due to the fact that it has quit acting like a battery cell and is acting like a resistance or load on the remaining cells, and as it is using up instead of producing voltage, it naturally gives a reverse reading on the voltmeter.

The P. R. Electric Starter Co., 7335 Vincennes avenue, Chicago, has developed plans whereby the battery station man can build an outfit from parts that he may have. The plans cost 50 cents. The P. R. Electric Starter Co. can also furnish any parts that may not be available.

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About Shows

THE automotive dealers and others interested in the sales end of this great industry who have held the thought that 1922 was a poor show year should have heard the reports of the several show managers who gathered at a luncheon during the New York show. It really was amazing what these men said of their show prospects and how great is the demand for space. Practically every one who has anything automotive to sell is apparently anxious to exhibit it where the public can see it.

Then, too, the New York exposition itself was a revelation as to the interest in shows this year. The management of the show was much more severe than ever before on the issuance of free tickets, and yet the daily attendance continued to make records from the first day. At the very first rush there were probably fewer persons waiting, but before the doors were closed at night the cash receipts had mounted to an unprecedented figure, so great indeed that the management made several checks before accepting the figures. Then on Thursday all records of attendance at an automobile show in New York were broken, the number being more than 2000 above any previous attendance.

Also the buying at this show was very good, much better than was expected, despite the more or less uncertainty about prices.

The show managers, who lunched together and then exchanged confidences, were all quite enthusiastic over the prospects in their communities. A number of them said that at the start it was a bit difficult to sell space, but as the day came nearer for the actual opening of the show they found themselves over sold. It is a fact that more applications for space have been returned for both the New York and Chicago shows than ever before.

The present attitude toward shows would indicate that this is a great show year and the community group of dealers who have not arranged for a show have made a great mistake. It probably is not too late to arrange for an early spring exhibition and the suggestion would appear to be:

GO TO IT.

Dealer Meetings

AT this writing there appears to be a disposition on the part of distributors and manufacturers not to hold dealer meetings during the Chicago show. Some of the older distributors are quite outspoken against this tendency, as they say if ever dealer meetings could be made profitable it is this year when dealers are anxious to know what is on the horizon for them and what the company or the distributor is going to offer to them.

It is a fact, easily verified by any one who was at the New York show or who has mingled with the dealers recently, that as a class they are looking for information. The dealer knows that he has a big job before him in selling his car for the next year and he is anxious to get at the job and be as well informed as possible when he meets the customer.

Moreover, the dealer is anxious to hear from some one, as high in authority as possible, just what the specifications of his job are going to be. He wants to know just how well the factory is settled in its selling plans and just how far the factory is going to back him up.

The dealer is hopeful as well as anxious and a word from the proper persons would probably make him hopeful and determined. It would appear that this is the time of all times to get the dealers together, speak a hopeful and confident word to them and then let them help each other by exchanging views.

The National Tractor Show

IN and around Minneapolis there is considerable enthusiasm over the prospect for a successful Tractor Show from Feb. 6 to 11. To a person from a less cold region than that selected for the show, there naturally arises the question as to temperatures.

The Minneapolis men, and many of those in the tractor and implement business in that section have gone there from more southerly states, and say that the weather is not a factor at all, that the visitor from communities where the temperatures are higher will not be inconvenienced during his visit there. While the average run of temperature is low, the buildings there are well prepared for it and a visitor will be quite comfortable at all times and that regardless of his home community, he will enjoy the dry northwest cold.

There are occasional days, of course, when visitors to this section of the country are inconvenienced. These are the days when a cold wave is blowing down from the northwest, but even these days are little worse in comparison than such days in other sections of the country because of the preparations for them, and this condition seldom obtains for more than one day.

It is a fact that hundreds of farmers and others who live in the northwestern states have written to the show

managers indicating that they plan to drive to the show in their cars. They are asking about sheltered parking facilities. Their concern is entirely about the vehicles, and not about themselves.

A visit to a northwestern city in this season reveals that there are as many cars parked along the streets of the towns and cities in that region as in more southerly cities. These cars, like the owners, are dressed for the temperatures, and do not suffer. More and more each winter the car is used in the cities where a below zero temperature is an almost nightly event and the trade in cars in that country has held up wonderfully during this winter season.

Temperature, after all, appears to be only a relative term and winter to the man or woman in the northwest has just about the same meaning as to the man in Texas and he is about as likely to lay his car by in one community as in another.

There would appear to be a lesson for dealers in this fact. Recently we talked with a dealer in a city where zero temperature is seldom recorded. This man had put away his car for the winter, thus setting a very bad example for his customers. In Minneapolis there are many dealers who use their cars daily, and go about their business errands in them. One St. Paul dealer said the other day that there had not been a day for two winters that his own car and his demonstration cars were not on the road.

When Selling Anti-Freeze

IT may not be amiss to mention here that it is well for dealers and their service departments to inform car owners as to the exact status of the anti-freeze solution they put into the radiator. For example, recently a car was driven into a service station for the purpose of filling the cooling system with an anti-freeze solution.

The solution, as prepared, was good for temperatures to zero degrees, but the owner was not informed of this fact. The result was that in a few days' running much of the solution had evaporated and had been replaced with water. Along came a sudden drop in temperature to below zero and the car was left standing at the curb for several hours. Naturally the lower part of the radiator froze and damage resulted. This owner blamed the service station, because he was under the impression that the water system of his car was protected against freezing.

Obviously the best procedure is for the service man to tell the owner exactly at what temperature the water will begin to freeze, and he should be further warned to occasionally have the supply replenished.

Bad Advertising

QUITE a number of dealers send copies of their advertising letters and posters to MOTOR AGE and we are always glad to get these. They have many suggestions as to points that will be helpful in preparing material for our readers. Most of the advertising literature that we receive in that way is very well constructed and can be classed as good advertising material, but once in a while there is one of another kind.

We cannot refrain from quoting from a recent letter which was sent to the service customers of a Chicago shop. In this letter this sentence is found:

> "It's a known fact that the average man's car is in the service station or repair shop 50 per cent of the time he drives it, with such troubles as carbon, valves, motor knocks, dirty spark plugs, or loose bearings."

This is about the worst statement we have seen emanating from any source and to know that a dealer bidding for service patronage would make such a statement is exceedingly surprising. If this statement was even approximately true, the motor vehicle would not be even a small measure of the success that it is today. It is safe to say that 10 per cent in the place of the 50 per cent as quoted would be a very extravagant statement, and if the 10 per cent average of time in the shop were true, the doom of the automobile would be sounded. It is extremely unfortunate that any person engaged in the automotive business should give out such statements as the above. If the service dealer who put out this statement could prove it, he would very effectually stop buying of motor vehicles. It would mean, in fact, that the man or firm who had use for a vehicle every day must own two to get the service of one.

All of this is written quite seriously and considers the quoted sentence quite apart from the wording, which is amusing. It says that the car is in the shop 50 per cent of the time that the owner drives it, which is quite impossible as the car cannot be in the shop and be driven at the same time. Let us hope that some of our dealers will become better acquainted with facts and the English language before they send more material of this kind to owners.

Danger in Legislation

A CONNECTICUT automotive dealer wrote to MOTOR AGE the other day and asked why the automotive interests in that state had not formed organizations to head off such restrictive legislation as is now becoming effective there. Just why there was not such an organization, MOTOR AGE does not know. Probably it was because automotive dealers have been somewhat indifferent to organization and the need for it. Dealers are of that opinion in other states and it is more than probable that within another year or two, the same question will come from other quarters.

Just now there comes a cry of distress from Connecticut about the elimination of 200 filling stations. These have been ordered removed because they were a "hindrance to traffic and constituted a public danger," or some such reason as that. Have any of you dealers been aware that the road edge filling station was such a danger point?

The solution from the problem is right here. The automotive industry must get busy and see that it is not discriminated against. No one part of the industry can do this, but the second largest manufacturing industry in the country, with its wide ramifications of employment, capital, usefulness of its product and its great benefit to the public at large, can do almost anything in the way of securing the passage of just and equitable legislation.

But this cannot be done by a few and unless the industry and the men in it wish to suffer materially from unjust taxation, unjust restriction of vehicles and generally unjust conditions of operation, they must get together.

It has come to the point where every dealer or executive must belong to an organization that has for its object the good of the industry and he must work and plan to bring results. A great educational campaign among those who make laws must be begun at once and all must have a part in it. We must act, talk and use our influence as an industry and for the industry and forget petty competition for the benefit of all.

Fifty Reductions Check Sales

Uncertain Prices Continue to Hold Up Retail Buying

Deferred Business Not Expected to Reach Full Volume Until After Chicago Show

NEW YORK, Jan. 24—Uncertainty of the public on the question of prices continues to some extent to hold up retail sales of automobiles. In New York the week following the show closed with a fair volume of business on the average. Some dealers had a remarkably good week, indicating that there had been an easing up of speculation regarding further price reductions, but others experienced a continuation of the holding back which became evident the latter part of show week, when news of approximately fifty price changes became generally known.

Indications now are that the apparent sizable volume of deferred business uncovered by the shows in New York, Philadelphia, Buffalo and several other large cities, will not become active until after the Chicago show, which opens Jan. 28. It is practically certain that some further price changes will be made by companies which did not reduce in connection with the New York show. These changes probably will be announced at the Chicago show and at the same time it will become known whether any manufacturers already in line with reductions contemplate "second cuts," which the industry does not consider likely, in view of the present pre-war, or near pre-war level of the majority of prices.

One factor which is causing considerable concern to manufacturers in the higher price classes is the announced decision of Henry Ford to take over the Lincoln plant if he can get it at what he considers a fair price. There now seems little doubt that he will be successful. While it is not expected that anything revolutionary will be attempted by Ford in the immediate future, there is little probability that he will be long content with limited production. The Lincoln plant has a potential capacity of 20,000 cars a year. At present prices there is no market for any such number of Lincoln cars. But if the introduction of Ford production methods, the Ford system of buying supplies and a sharp curtailment of costs will permit the sale at $2,500 of a Lincoln car in which little of the quality has been sacrificed, the market for the product will be greatly enlarged.

So far as his own car is concerned, Ford has done the industry generally a good turn by his recent price reduction of $6 on the touring car and $15 on the enclosed models. It will do much to convince the public that motor car values are about down to rock bottom. There are few companies in the lower price classes which can afford to make further material cuts.

The biggest job at present is to convince prospective purchasers that they can save little money by deferring purchases. By far the largest proportion of the "live" prospects now are owners of automobiles and they expect to trade in their old cars. In their case every price cut automatically reduces used car values, so they will make practically nothing on any reductions which may come.

The record attendance at the New York show demonstrated that public interest in motor cars is keener than ever. Bankers have been particularly pleased at the manifestation and it has had something to do with the recent rise in motor stocks. Manufacturers were deeply gratified and all of them are making preparations to meet the spring demand which they consider inevitable. As a consequence business of parts and accessory makers is running on practically the same basis as for the last three months.

"There's the 2-Ton Truck," Remarked Ford to Brisbane

New York, Jan. 21—Arthur Brisbane is the latest representative of the Hearst interests to obtain an interview with Henry Ford. He labels it, "All About H. Ford," and sketches briefly his plans for the purchase of the Lincoln plant. The chief interest of the industry in the Brisbane report, however, is the statement that Ford pointed to a mechanical drawing with the statement:

"There's the two-ton truck. It will have the front end of my tractor, the engine and the rear end of the present Ford truck. See how much space we save by putting the driver close up in front."

Brisbane quotes Ford by saying the truck will be ready, "perhaps next July."

TIRE MAKERS' PRODUCTION

Milwaukee, Wis., Jan. 23—To bring the tire business of the United States to a substantial and practical basis, about half of the manufacturing concerns in the field will either go out of business or the production in the aggregate of all concerns will be reduced about 50 per cent, according to an analysis of the industry presented by Arthur A. Frank, general manager of the Federal Rubber Co., of Cudahy, suburb of Milwaukee, in addressing a meeting of executives and foremen of the works.

Michigan Circuit Opening Is Auspicious at Pontiac

First of Ten Syndicated Exhibits Meets With Dealer and Public Approval

DETROIT, Jan. 19—Michigan' automobile show circuit started on its official course last night with the opening of the Pontiac show. In its avowed intention of bringing a big-town show to a small-town populace, it has had an auspicious start and its progress across the state will bring a new meaning to the term "automobile show" from the smaller town viewpoint.

Circuit Saves Money for Towns

To the attendees it means the presentation of cars and equipment in surroundings to which they have formerly been unacquainted, except on a greatly reduced scale. It means the presentation of mechanical features through the agency of cut-out chassis and special exhibits, which for the most part hitherto have only fallen to the lot of attendees at big city shows.

To the dealer it has the advantage of permitting a rather gorgeous exhibition without the heavy expense that would otherwise be incurred. By contracting with a decorating organization for the use of the same decorations in each of the 10 cities to be visited, the cost has been cut two-thirds. The decorations at the Pontiac show, if hung for that show exclusively, would have approximated $1500. They are costing $500, and each city visited will pay the same figure for the same setting.

Dealers Enthused at Pontiac

The dealers are enthusiastic over the amplitude of the show permitted under the circuit plan. They are agreed that it is the prettiest show ever given in Pontiac and the attendees on the first night were similarly impressed. A definite idea of the impression made upon dealers by the Pontiac exhibit is found in the action of the Washtenaw County Dealers' Assn. in voting to come into the Michigan Automobile Trade Assn. in a body.

Special exhibits arranged for the circuit through the agency of the state associations include chassis and engine exhibits by Buick, Nash, Oakland and Willys-Knight. The Packard company will exhibit a special single six touring car in each city of the circuit in which there is Packard representation. Factory demonstrators will be in charge of the mechanical exhibits.

The color plan of the show decorations is black and white.

Great Merger Looms in Detroit

Good Roads Congress Favors Roads 20 Feet Wide or More

Annual Convention and Exhibit In Chicago Draws Large Crowds to Coliseum

CHICAGO, Jan. 19—An estimated attendance of from 10,000 to 12,000 road engineers, contractors, state and county highway officials and members of highway associations, a greater variety of exhibits and dull interest in buying equipment marked the Twelfth Annual Good Roads Congress and show, which was in all week session at the Coliseum this week.

The road-making machinery exhibits were more complete this year than ever before. They were given special care and thought because of the belief among the makers of this equipment that contractors would be in the market for a vast volume of road-making tools. The buying power of the thousands in attendance did not develop to anything like the proportions of former years.

There were about 15 truck manufacturers represented at the show, including: Reo, Autocar, Republic, Titan, GMC, Parker, White, Fugol, Mack, Stoughton, Indiana, Ford, Cook, Kissel, Schacht and Four Wheel Drive.

The old contention between the heavy duty and light duty truck as to which is the better adapted to road-making work was very much in evidence. Reo showed a Speed Wagon with scraper and hoist body. This is one of the new machines at the show and was the center of much interest. The one radically new vehicle at the show was the Cook two and one-half-ton truck, a product of the Cook Motors Corp., Kankakee, Ill. This truck is made from standard parts, powered with a Hercules engine, Model 1 CU-R, Stromberg carbureter, Berling ignition, Borg & Bech clutch, Cotta transmission, Lavine steering, and Shuler axle. The frame is double pressed steel six and one-half inches deep, telescoping for various wheen base lengths from 96 in. to 184 in. Easy riding qualities at high speed are claimed for this truck. The engine is mounted on a subframe and the load is carried on the rear frame. Each frame has complete spring suspension.

Before the delegates to the Good Roads Congress, the big questions were in the financial, legislative and engineering aspects of improved highway construction.

Alfred Dryland, highway engineer of Middlesex, England, told the Congress that American roads were dangerous because of their narrowness and predicted that at the rate of increase in American highway transportation it would not be a great while before we would have to build roadways 150 ft. wide in congested centers.

In face of this prophecy, Clifford S. Lee, of the resolutions committee, offered a resolution that met with the almost unanimous approval of the Congress declaring for a minimum roadway of 20 ft.

Among prominent speakers at the Congress were Thomas H. McDonald, chief of the United States Bureau of Public Roads; Jay Downer, chief engineer of the Bronx Parkway Commission; William Ord, manager of the Lakewood Engineering Co.; D. C. Fenner, of the United States Public Works Department; M. O. Eldridge, chairman road board, American Automobile Assn.; A. R. Hirst, chief highway engineer of Wisconsin; Prof. Arthur H. Blanchard, of the University of Michigan, and others.

Sales Attendance, Exhibits Set New Mark at Buffalo

Buffalo, Jan. 21—Breaking records as seen from almost any viewpoint, the "Prosperity" show of the Buffalo Automobile Dealers' Assn. closed Jan. 21, after a week, the influence of which will long be felt by the trade of western New York.

In point of number and variety of cars and accessories shown, in attendance, and in the number of prospective purchasers revealed to dealers, the show, the twentieth in Buffalo's history, set new records.

In the Buffalo exposition the importance of service was given greatest prominence. Dealers invited car users to bring their problems to the show, and this was done in thousands of cases. Mutual good resulted from many of these discussions.

More than 300 passenger cars and 100 trucks were displayed in the 74th Regiment armory.

At a meeting of dealers Jan. 18, Ray W. Sherman was the principal speaker. He told the dealers new car sales this year should reach, if they did not exceed, the 1921 mark. He advised the dealers to forget the bogey of reaching the "saturation point" in the automotive industry.

"The year 1922 will see the keenest competition and the greatest advance in the history of the automobile," Sherman predicted.

READING SHOW DATES

Reading, Pa., Jan. 20—Jan. 23 to 28 inclusive has been selected as the week for the Reading automobile show.

Ford-Lincoln Situation Holds Eyes of Industry

Lelands' 15 Models Expected to Be Continued Under New Plan But at Lower Price

NEW YORK, Jan. 17—Nothing in recent years has caused greater interest and wider speculation within the automotive industry than the announcement that Henry Ford and his family probably will obtain control of the Lincoln Motor Co. when it is sold by the Detroit Trust Co. as receiver on Feb. 4. The bid of $8,000,000 filed with the federal court by Harold H. Emmons as attorney, came from the Ford family, including Mr. and Mrs. Henry Ford and Edsel Ford.

The offer of $8,000,000 was the upset price fixed by Judge Tuttle and it is stated the Fords are willing to raise their offer to $11,000,000 rather than have the property get into other hands. It is not believed, however, that they will have any serious opposition.

If the property goes for $8,000,000 it will fall short by $2,000,000 of meeting the liabilities which approximate $10,000,000. There are outstanding 146,000 shares of class A stock of $50 par value which would get nothing from a sale at that price.

What Will Ford Do?

The industry is not so much interested in the financial details of the transaction as in what use the Fords will make of the property if they get it and there seems little doubt that they will. No details of their plans have been made public but it is not denied that they will put into effect the well known Ford production methods.

Purchases of parts and materials, it is understood, will be made through the Ford purchasing department and the result, with the introduction of efficiency methods in production, would be much lower costs which would make possible a sharp reduction in prices. Reports that these would be scaled down to $2,500 for the touring car have not been denied, although there is no probability that any such cut will be made immediately. The effect of such a policy upon other companies in the higher price classes needs no discussion.

It is not the Ford plan so far as can be determined, to lower materially the quality of the Lincoln car. It is generally conceded, however, that a car of practically the same quality can be turned out in much larger quantities at a materially lower cost by the elimination of construction refinements and tests which have been insisted upon

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Newark Dealers Outline 3 Plans to Move Used Cars

Centralized Appraisal and Sales Bureau, Permanent Committee or Appraiser to Solve Problem

NEWARK, N. J., Jan. 20—Three plans have been proposed by the Newark Automobile Trade Assn. to meet the used car situation, the main purpose being to stabilize conditions as a protection to the buying public.

The first plan provides for a centralized used car appraisal and sales bureau to which all used cars to be traded in are referred. The used car is appraised and a certificate of value issued. This certificate will be based upon the appraisal expert's opinion of what the car can be sold for, less cost of conditioning, sales expense and normal profit to cover overhead. A commission will be charged the dealer for the sale of the used car.

A method of financing membership in the used-car association or corporation is included. The exchange is to be operated impartially. No one will own more stock than another and a limit to the number of cars to be handled will be set. This plan includes regular advertising in daily newspapers, explaining it to the public and reasons therefor, all with the view to securing the confidence of the public in cars handled by the exchange, which are to be guaranteed. Cars are to be classified as to condition so that the public will know what it is buying.

No certificate of value or receipt for a motor vehicle to be left on consignment or written appraisal will be given an owner until he shall show an accepted order of contract for a new vehicle from a co-operating member. The affairs of the exchange are to be governed by a committee elected for that purpose. Profit and loss sheet shall be given shareholders every 30 days and audits will be held periodically.

This plan is expected to put trades on the same plane with straight sales.

The second plan proposes that a permanent used car committee shall obtain through its secretary from every dealer in the city monthly figures showing the amount received for each new vehicle sold, with condition, make, amount spent for conditioning and an appraisal from the dealer of the price, in his opinion, of the various models o used cars of the make or makes he represents, for trading purposes. These figures, when approved by the used car committee, are to be published and distributed to those dealers who have co-operated. Such a list would be used merely as a guide to current values of the different types and makes.

The third plan provides for a competent appraiser, with a set fee charged for each appraisal. This man, as in the case of real estate appraisers, will be considered an expert and will govern his appraisals impartially, if necessary by figures procured as maximums as outlined in the second plan or by the use of the Chicago Blue Book. This office is likened to the schedule rating bureau maintained by insurance underwriters.

City of Chicago Pays Dearly For Service in Own Shops

Chicago, Jan. 20—Through exposure of overcharging and inefficient operation of city service stations in which all the city automotive equipment has been serviced, these shops have quit and a great deal of work will hereafter be thrown into legitimate channels. It has been shown that the work done in the municipal shops has been costing the city 300 per cent more than it would have cost on the outside.

The city shops charged $5,113 to repair six particular Fords for one year. During the year the repairs on one other Ford was $1183. Other instances are almost as high.

On a truck the repair bill was $2866 and three months after that had been paid it was in the shops for another $500 overhauling.

DALLAS SALES INCREASE

Dallas, Texas, Jan. 21—The actual retail automobile business in Dallas for the first 15 days of the new year shows an increase of some 20 per cent over the same period for the preceding month, according to reports from the retailers. The same reports indicated the sales for the months would be on something like the same basis. Easier money conditions and cheaper cars are given as the reasons for the increase in business.

The accessory and tire business shows an increase of some five per cent over the first 15 days of Jan., 1921. The truck sales and trailer sales show slight increases, it was said.

The retailers are optimistic over the outlook for the year.

NICE GAINS CONTROL

Philadelphia, Jan. 20—Control and ownership of the Nice Ball Bearing Co. by Budd G. Nice, the president, and members of his family, was obtained by the terms of a settlement entered into before the United States court of appeals in New York. The Nice company is a Pennsylvania corporation and a leading independent manufacturer of ball bearings. The suit was to determine whether or not the company was to be absorbed by a rival concern.

PACKARD HAS SMALL TRUCK

Detroit, Jan. 20—The Packard Motor Car Co. expects to go into production some time this year on a ¾-ton truck which it has been designing and experimenting with for several years.

19 Enter French Grand Prix Race at Strasbourg July 15

France, Italy and Great Britain Name Teams for Contest Over Slow Course

PARIS, Jan. 10—(By Mail)—Nineteen cars, representing France, Italy and Great Britain, have been entered for the French Grand Prix automobile race for 122 cu. in. machines, to be held at Strasbourg on July 15. The French representatives are Rolland-Pilain 3, Delage 2, Bugatti 4, Mathis 1, and Slim-Pilain 1. Italy is sending a team of three Fiats; England has entered three Sunbeams and two Aston-Martins.

On the day following the 122 cu. in. race and over the same course, there will be a fuel consumption speed test, in which sixteen French cars will start.

The Strasbourg course selected for the French Grand Prix is the shortest ever used for a French race, being only 8.3 miles. Distance of the race will be about 500 miles. The course has one hairpin and two right angle turns, and several winding portions; the fastest stretch, a three-mile straightaway, is slightly on the upgrade. The average speed cannot be very fast, and the winner will doubtless be the one with the fastest pick-up and the best braking system, rather than the car with the highest maximum speed on the level.

The following list indicates the drivers so far as they are known at present. It is understood that Ralph de Palma has signed a contract to drive a Voisin in the fuel consumption Grand Prix.

1	Rolland Pilain	Albert Guyot
2	Rolland Pilain	Victor Hemery
3	Rolland Pilain	
4	Sunbeam	Jean Chassagne
5	Sunbeam	K. Lee Guinness
6	Sunbeam	S. R. O. Segrave
7	Delage	Rene Thomas
8	Aston Martin	Marshall
9	Aston Martin	
10	Slim Pilain	Lecot
11	Delage	Montjoe
12	Fiat	Louis Wagner
13	Fiat	Pietro Bordino
14	Fiat	Biagio Nazzaro
15	Bugatti	Ernest Friedrich
16	Bugatti	Viscaya
17	Bugatti	Mones - Maury
18	Bugatti	Marcot
19	Mathis	Lahm

Paris, Jan. 10—(By Mail)—Five Benz and three Mercedes cars have been entered in the European Grand Prix automobile race to be held in northern Italy, either at Brescia or near Milan, next September. This race promises to be the nearest to an international speed contest in Europe this year, and is the only one in which German firms are admitted. It is believed that Opel will put in a full team. Among allied firms practically certain starters are Fiat for Italy, Sunbeam for England, Rolland-Pilain and Bugatti for France.

The Benz cars, which are already

under construction, are being built under the patents of Dr. Rumpler, one of the leading German aviation experts. Rumpler, who has sold his license to Benz, places his engine at the rear of the chassis, drives to the rear wheels, and in addition to abolishing practically all unsprung weight obtains a perfect streamline form. The road springs are inside, as well as all spare wheels and accessories. For touring purposes, Rumpler claims improved suspension, more comfort and room for the passengers and greater fuel economy. For racing, particularly under the 122-cu. in. rule, he claims an immense advantage by reason of a scientific streamlining hitherto unknown in automobile practice. The racing cars have six cylinders in line, the center of the engine being just a little to the rear of the center of the chassis, while the driver and mechanic are seated ahead of the engine, with only just sufficient of the head projecting to give a view of the road. Height of the cars from the ground will not exceed 26 inches. With this design it is impossible to keep down to the minimum weight of 1430 lbs. Rumpler claims that the 2-litre racers will show a speed of 115 miles an hour on the road.

The new Mercedes racers are declared to follow more on conventional lines. These machines will be handled by the pre-war team, comprising Lautschlager, Salzer and Seiler. As Fiat, Sunbeam, Rolland Pilain and Bugatti are known to be working on entirely new designs, the European Grand Prix will be a contest of exceptional interest.

WAYNE TANK DIVIDENDS

Fort Wayne, Ind., Jan. 21—A very prosperous year for the Wayne Oil Tank & Pump Co. of this city was indicated at the annual meeting of the organization held here recently. The board of directors declared a 20 per cent stock dividend on the outstanding common stock, a 12 per cent per annum dividend for the year to be paid in monthly installments during 1922 and an extra cash dividend of one per cent to be paid Feb. 1 of this year.

Officers were elected as follows: President, W. M. Griffin; first vice president, H. C. Berghoff; second vice president, W. F. McGuire; third vice president, B. F. Geyer; secretary, C. G. Guild; treasurer, E. A. Zern.

DECATUR ASSOCIATION OFFICERS

Decatur, Ill., Jan. 20—At the annual meeting of the Decatur Automotive Dealers' Assn. new officers were elected for the coming year as follows: President, Guy Deetz; first vice president, Howard Hanthorn; second vice president, James Rattan; secretary, Leo Hayes, and treasurer, William Shellabarger. No action was taken regarding a spring show of cars, due to the inability of the committee to make a report upon a suitable building. It is hoped to find a location later.

Ford Sales For 1921 Soar Once Again Above Million

Year's Business Larger Than 1921; Factory Officials Decidedly Optimistic of 1922

DETROIT, Jan. 20—A statement on business isssued by the Ford Motor Co. says:

"Retail sales of Ford cars, trucks, and Fordson tractors have again exceeded the million mark for the year 1921.

"The Ford factory and assembly plant production figures reached a total of 1,050,740 cars, trucks and tractors for the year, with retail sales by dealers approximating 1,093,000, which in the United States alone surpassed the 1920 retail sales record by 104,213 Ford cars and trucks.

"The Ford company says the outlook for 1922 is decidedly optimistic. In fact, concrete evidences already exist in that car and truck retail sales for December, 1921, exceeded December, 1920, sales by almost 25 per cent, and Fordson tractor retail sales for the same periods show an increase of over 100 per cent for December, 1921, as well as an increase over the total tractor sales for the month of November.

"These facts seem to indicate that not only are the farmers buying more freely, but the general public is becoming more responsive and receptive.

"Another point brought out by a comparison of production figures for the past two years shows that Ford enclosed cars are gaining in popularity, as 23 per cent of the 1921 production were sedans and coupes, as against a total of 18 per cent for the year previous.

"Ford is giving employment at present to approximately 40,000 men in his main plant at Detroit, the importance of which is emphasized when consideration is given to the fact that nearly 20 per cent of the city's population is directly dependent upon the Ford Motor Co.."

For once in his life Henry Ford has done what other automobile manufacturers admit is a service to the industry. They believe his most recent price cut of $7 on the touring car and $15 on the closed models will do more than anything else to convince the public that automobile prices are down as far as they can go.

Other manufacturers say it is evident that even Ford, with his tremendous production, has reached the point where he can reduce prices no further and still make a profit on each vehicle. Most of them contend they are in the same position. It undoubtedly is true that most manufacturers in the lower priced classes cannot do much more cutting if they expect to remain in business.

A. R. MOSLER & CO. ORDER

New York, Jan. 14—An order has been issued by Federal Judge Hand upon petition of Peter B. Olney, Jr., and Archibald R. Lemieux, coreceivers, directing the creditors of A. R. Mosler & Co., spark plug manufacturers, to show cause why the factory of the company at Mt. Vernon, N. Y., should not be sold to the Noesting Pin Ticket Co. for $65,000.

ROCHESTER LEAVES OLD RUTS

Rochester, N. Y., Jan. 21—The Fourteenth Annual Rochester Automobile Show might well have been termed "Educational Week," so far as the public was concerned, for the dealers refused to be a party to any more used-car propositions. The dealers, during the show, flatly refused to offer high prices on used cars, despite the fact that those persons were willing to purchase new cars.

The Rochester show departed from its usual procedure this year by barring all trucks, limiting the show to accessories and passenger cars. The attendance the first few days of the show was considerably higher than in other years, despite the fact that no free tickets were issued by the dealers.

Rochester Show Draws Large Crowds

Ford Reductions Made to Steady Public In Buying

Company Officials Believe New Price Will Result In Continued Sales

DETROIT, Jan. 18—Ford Motor Co., through its latest price cut, has undertaken to disabuse the public mind of the somewhat general opinion that there is still plenty of room for reduction in motor car prices. Besides fixing the prices at a new low level, the reduction is intended to break upon the public consciousness the fact that further reductions are not worth waiting for.

As a means of putting an end to hesitancy in buying motor cars, the reduction is expected to prove valuable. By showing a hesitating buyer that further waiting cannot result in a reduction of any size, it is hoped to break down this sales barrier. A reduction of $10 or $20 on a $400 or $500 purchase lends neither inducement to buying nor is it likely to impress people with the worth of waiting further.

These things were carefully considered in formulating the new list price and the effect as noted from dealers has been largely as anticipated. Actual results in sales stimulation cannot be estimated yet because of the shortness of time in which the new prices have been effective. It is believed at the company offices that the new price declaration will make for steady and continued buying rather than for a sudden spurt.

Reductions by Ford Motor Co. of Canada range from $60 on the sedan to $20 on the runabout. The reductions on the Canadian made cars range somewhat heavier than the the American because the Canadian car is considerably heavier and higher priced.

ALCOHOL SALES LEGAL

Columbus, O., Jan. 21—After a conference between officials of the Ohio Automobile Assn. and the State Pharmical Board, it was announced that the ruling of Attorney General Price to the effect that only registered pharmacists could sell denatured alcohol would not be enforced. Representative Wendt of Columbus, the author of the bill in question, agreed to introduce an amendment exempting garages and filling stations from the prohibition of selling alcohol. The former ruling was that garages and filling stations would be given 30 days to dispense with their stocks. Now it is promised that they will not be molested, but they will be required to change their signs from "Alcohol" to "Completely Denatured Alcohol."

AMERICAN PLANT SOLD

Newark, N. J., Jan. 21—Sale of the physical assets of the American Motors Corp. to a syndicate of stockholders was confirmed after a hearing before Judge Charles F. Lynch of the United States District Court. A flat sum of $200,000 was realized from the sale, which included production and service stores and the plant at Plainfield, N. J., other assets being retained by the receivers. The sale was approved on the recommendation of a large majority of creditors. The property will be taken over by a new corporation to be known as the American Motors Corp. of New Jersey, which will continue the manufacture of the American line of cars substantially in their present form. The reorganized company will have a capitalization of $500,000.

Earl Motors, Inc. Financing Plans Approved by Creditors

Chicago, Jan. 19—Ralph Van Vechten, vice president of the Continental & Commercial Banks and member of the creditors' committee of Earl Motors, Inc., reports that approximately 80 per cent of the creditors have signed or agreed to the settlement agreement drawn up by the committee.

Under the committee a plan is forming to carry out the creditors' deposit agreement. The creditors of the company will assign claims and accept deferred debentures and prior preferred stock to be issued by the company.

These debentures will draw no interest for one year and will mature in five years. The interest rate after the first year will be 6 per cent, payable only out of the net earnings of the company. The debentures will be subordinated to the payment of all indebtedness incurred after their date. The prior preferred stock will be preferred as to assets and dividends at the rate of 7 per cent annually against the present preferred and common stock of the company. In case the present preferred stock waives the present dividends while the prior preferred stock is outstanding, the preferred dividends will not be cumulative. Dividends will be payable on the prior preferred stock only after the payment and retirement of the deferred debentures.

Edward Tilden & Co. will receive two-thirds of its claim in prior preferred stock and one-third in deferred debentures. All other creditors will receive one-third of their claims in preferred stock and two-thirds in deferred debentures.

RYAN OUT OF STUTZ

New York, Jan. 18—Allan A. Ryan, who sailed for Europe yesterday, resigned as a director and chairman of the board of directors of the Stutz Motor Car Co. before he left the city. He retains his stock interest in the Stutz company, but it is in the hands of trustees and does not require his attention. Upon his return, Ryan expects to devote most of his time to the affairs of the new Frontenac Motor Co., of which he is chairman of the board.

Persistent Volume of Sales Holds Optimism in Chicago

Manufacturers and Dealers Report Business Better Than Year Ago, With Future Bright

CHICAGO, Jan. 21—Decidedly, the spirit prevailing in the automotive industry in Chicago is one of optimism. This view has been taken since the closing days of the old year. With the opening of the new year, sales that were expected to be very slow did not follow expectations and up until the present time Chicago business is better than for the same period a year ago. Country sales are slow, but there is a healthy flow of sales in the cities. This is especially true of Chicago.

It is the general opinion of Chicago dealers that nothing sensational is to be expected in sales for 1922. They believe that the volume of business will increase as the season advances until business will be good. Nothing better than "good" business can be hoped for, is the general expression. A turn for the better is expected either in March or April.

Automobile Row in Chicago is of one opinion with respect to the new relationship so much hoped for between the factory and the dealer. A new era of understanding and co-operation is the thought that is running through the minds of all and to many this condition has real existence.

A substantial proof of the optimistic spirit that prevails here will be found this coming season in the new sales and service building that is to be erected for the Hudson-Essex distributors on Michigan avenue. The building will have a frontage on the avenue of 100 ft. with a depth of 399 ft. three stories high.

Factories in Chicago in all lines report better business than a year ago, with prospects for the year infinitely better. Some of the local truck makers are doing a fair volume of business. All report sales far in excess of those a year ago at this time. Nothing like capacity production is in evidence, but sales are increasing and general business seems healthy.

INDUSTRY REPRESENTED

Washington, D. C., Jan. 21—Representatives of the automobile industry have been assigned to two important committees of the Agricultural Conference, which will convene here next week. Windsor T. White will serve on the Railroad Committee, while Roy C. Chapin and H. S. Firestone will be members of the Highway Committee. These three spokesmen for the industry will act in an advisory capacity and will have much to do with shaping the conference program, especially on the subject of transportation as it relates to motor transport.

BUSINESS NOTES

Oakland Motor Car Co., at Pontiac, has just completed an addition to the motor plant at a cost of approximately $500,000. This new addition has added 200,000 feet of floor space for manufacturing purposes.

Walden-Worcester Wrench Co., of Worcester, Mass., has been reorganized with a capital of $300,000 first preferred stock, and $250,000 second preferred and 2,500 shares of common stock and creditors will receive part of their claims in cash and the balance in stock of the new company. The officers are: President, J. Vernon Critchley; vice-president and general manager, Warren S. Bellows.

General Auto Supply Co. of Lancaster, Pa., have moved their headquarters and main offices to Harrisburg, Pa. It is the intention, however, to continue the stores at Lancaster and York, Pa., but the Lebanon branch was closed on the first of January.

Multibestos Company, makers of brake and clutch linings, announce the appointment of **Albert J. Roemer** as district manager for metropolitan New York, with offices at 105 West 63rd street. Heretofore Roemer has had charge of Multibestos sales in the upper New York district.

Harvey Fisk & Sons, Inc., are about to bring out an issue of $1,750,000 of first mortgage collateral eight per cent Convertible Gold Bonds authorized by the United States Automotive Corporation, holding company for a strong combination of Indiana motor car and parts-making plants controlled by Frank B. Ansted, of Connersville, Indiana, and his associates.

Mid-West Rubber Manufacturers' Assn. will hold its third annual dinner at the Hotel Morrison, Chicago, Tuesday, Jan. 31. C. C. Christie is chairman of the Banquet Committee and W. W. Ruchter is president of the organization.

Yellow Manufacturing Co. directors, at their annual meeting, voted to increase the number on their board from nine to eleven directors, the additional two to be elected at a special meeting.

Des Moines Ford plant resumed operations last week after a two weeks' layoff for inventory. Approximately 680 men were employed with the resumption of work.

G. C. Kuhlman Car Co., and **Gustav Schaefer Wagon Co.**, have found the motor bus field a surprisingly large one and also a profitable one. In fact the two companies, which are among the oldest and best established in Cleveland, are looking forward to the time when the motor bus business will equal the volume of their regular lines.

Storms Auto Supply Co., Kansas City, Mo., is the subject of a petition in bankruptcy in the federal court, filed December 30, the petitioners being Missouri Valley Electric Co., claiming $276.74 owing; Vacuum Oil Co., New York, $284.08, and Shapleigh Hardware Co., St. Louis, $77.50. It is alleged in the petition that on December 15 a general assignment for benefit of creditors was made; and that W. C. Seattle and J. E. Harris were placed in charge of the business as representing the follswing three creditors: Union State Bank, Kansas City; Ardmore-Akron Tire & Rubber Co., Ardmore, Okla., and Manufacturing Tire Sales Co.

The Cleveland Co. has been putting men to work recently, and the production has been augmented greatly. This company also is hiring more men and will continue that policy through the month and February also.

The Templar has been a good business getter at the New York show and so has the Grant, according to reports. Both concerns have added to their force of workers and are still on the lookout for additional men.

Byerley Tire & Repair Co., Kansas City, Mo., is the subject of a petition in bankruptcy filed in the federal court Dec. 30, the petitioners being B. F. Goodrich Rubber Co., claiming debt for merchandise of $343.12; Oldfield Tire Company, $7,041, and United Autographic Register Co., $125.79. The petition relates that a receiver was appointed for the Byerley Company by the Jackson county circuit court, and is now in possession of the property.

Jordan plant says that reports filtering back from the New York show are tnat the orders received are in excess of those obtained at the previous exhibition. It is said that the record is 25 per cent better and that business already booked this year is a quarter better than it was a year ago at this time. This company made a very good record in 1921.

George D. Bates of Akron as trustee of the bankrupt Portage Rubber Co., of Barberton, has filed suit against the Rubber City Clearing House of Akron and against A. H. Noah, its president, for $136,153 under order of the bankruptcy courts. The Portage Rubber Co. was the parent concern of the Portage Tire & Rubber Co., recently purchased by the new Seiberling Rubber Co. According to Bates an agreement was reached between Noah and the Portage Rubber Co. in November, 1919, whereby the Rubber City Clearing House was to purchase all the "scond" tirs to b manufacturd by the Portage Tire & Rubber Co. during the ensuing year. Bates claims several car loads of tires were delivered to the Clearing House but were rejected. He specifies the sum of $163,153 as representing the loss sustained and as being the difference between the price to have been paid by the Clearing House, and the ultimate price for which the tires had to be sold.

Fisher-Ohio Body Plant business is running at almost top speed. The plant has been in operation three months and during that time the layout and form departments have put in considerable overtime work, which has included nights, holidays and Sundays. There are 2000 employed at present, but E. F. Fisher states that 1000 more will be added within the next three months, while by early summer he expects that the plant will be operating at capacity with between 4500 and 5000 persons on the rolls. The Fisher plant is now engaged in making bodies for General Motors, Chandler and the Cleveland companies.

A. J. Stephens Rubber Co., a tire and accessory manufacturing house, has been placed in the hands of a receiver through petition filed by creditors. It is thought, however, that with sufficient time, reorganization of the company will be possible.

Southwest Finance Co., Kansas City, has been asked to be declared bankrupt in the Federal court by S. J. Eisberg and others.

P. J. Downes Co., Kansas City, has had filed against it a bankrupt petition by the First National Bank of Minneapolis, and the J. I. Case Plow Works of Kansas City.

Nash Motors Co., Kenosha, Wis., declares a net profit of $2,226,078 for the fiscal year ending Nov. 30, 1921. All expenses, inventory, etc., have been deducted.

Cleveland Rubber Mold & Machine Co. officers and directors are sought to make up the sum of $248,612.16 which, it seems is not available for stockholders and creditors.

Victor Rubber Co., Springfield, O., according to treasurer H. H. Durr, is now in production of from 300 to 500 tires daily and that prospects for the year are very encouraging.

Kelley Tire & Rubber Co., New Haven, Conn., bankrupt, has been granted an extension of time in which to raise the money necessary to pay off the debts standing against the company.

Bullard Machine Tool Co., Bridgeport, Conn., has started motorcycle manufacturing on something of an extensive scale. Vice president Bullard says that he expects production of engines to grow considerably in 1922.

Raymond Mfg. Co. of Milwaukee is a new corporation organized with $30,000 capital to manufacture a line of automotive parts and equipment and other metal specialties. The incorporators are Charles S. Raymond, Frank L. Martinek and William H. Schmahl, attorney.

Judge Daniel H. Gregg of Enona, Ill., has been appointed receiver of the William Holzinger Tractor & Implement Co., of Annawan, Ill. Holzinger lists liabilities of $500,000 and assets of $250,000.

The Goodyear Tire & Rubber Co., Columbia, S. C., has filed with the secretary of state a certificate of withdrawal of business from South Carolina. The company ceased to operate in the state December 31, according to the certificate.

Russell Motor Car Co. has declared a quarterly dividend of 1 per cent on the common stock, thus reducing the rate from 7 to 4 per cent per annum. The directors declared the regular quarterly dividend of one and three-fourths per cent on the preferred stock. Both payments will be made on February 1, to stock of record January 23.

Sterling Metal Products Co., organized recently at Racine, Wis., by William Perry and H. F. Teshnow, who established a factory in the Sattley industrial building at Racine Junction, making automotive and other metal specialties, have acquired the entire assets of the Splitex radiator & Mfg. Co. of Racine, which made an assignment to Richard G. Harvey in favor of creditors. The Sterling company will undertake the manufacture of Splitex radiators for passenger and commercial cars, tractors, etc. The Splitex Company was incorporated for $150,000 four years ago and built a modern plant, but for several months was inactive due to slow business in the tractor industry and the stockholders decided to liquidate.

Arthur W. Sutton has retired from the garage firm of Sutton & Jackson, Farmer City, Ill., and his partner, James H. Jackson will continue the business under the name of the Farmer City Auto Repair Co. Mr. Sutton's plans are not yet announced.

The Denlinger Lamp & Ignition Co., Inc., of Syracuse, has filed a petition in bankruptcy with liabilities of $21,169 and assets of $12,819.

Dependable Mfg. Co., Streator, Ill., has been organized by C. A. McCormick, M. E. McCormick, and W. H. McCormick. The new concern has been incorporated with capital stock of $10,000 and will manufacture and distribute accessories for motor vehicles.

Ray Sherman Talks to 500 Des Moines Automobile Men

Des Moines, Iowa, Jan. 20—Ray Sherman, formerly executive editor of the Class Journal publications, addressed the largest meeting of motor tradesmen held in Des Moines in more than a year, on Jan. 13, the occasion being the annual meeting of the Motor Trades Bureau of the Chamber of Commerce.

Sherman gave his illustrated talk on "Ask 'Em to Buy" and maintained that the next 12 months would develop a standard of business which would continue over a period of several years. He declared that since previous to the war period all business had been in a more or less disturbed condition, but that during the next month normalcy would be reached and that the standard now developed would continue indefinitely.

More than 500 men were in attendance at the meeting which was held in the Herring Motor Co. auditorium.

DES MOINES DEALERS ELECT

Des Moines, Ia., Jan. 20—The Des Moines Auto Dealers' Assn. held its annual meeting last week and elected the following officers: Dean Schooler, president; W. W. Sears, vice-president; C. L. Herring, treasurer. Dean Schooler and C. G. Van Vliet, who have managed every automobile show in Des Moines, were again named to manage the show this year. The show dates are Feb. 27-March 3.

QUAKER CITY SHOW

Philadelphia, Jan. 21—In an Italian renaissance garden setting, the Philadelphia Automobile Trade Assn. opened its 21st annual automobile show Jan. 14. There were 74 car exhibitors and 50 accessory booths.

Seven cars were shown for the first time here this year. They are the Fox air-cooled car, manufactured here; the Gray, Meteor, Rolls-Royce, Wills-St. Claire, Earl and Durant. The Stanley was the only steam car shown and the Rauch & Lang was the only electric vehicle on the floor.

No commercial vehicles were shown.

IN THE RETAIL FIELD

Springfield Durant Co., Springfield, Mass., will open business Feb. 1 in its establishment now near completion at an attractive corner on the main route leading from Hartford into the city. The company, headed by Ward Lederer, has the distribution of cars for Hampden and Hampshire counties.

The Godfrey, Rolfe, Duffy Co., Inc., will open an accessory store in Springfield, Mass., Feb. 15. I. W. Godfrey, formerly manager for the Post & Lester Co. of that city, heads the company.

Used Car Corp., of Birmingham, Ala., opens this week under the direction of C. A. Brisom, who is acting representative or agent for the various banks and loan houses who fail to collect money from a car owner, when the car is used for collateral.

The Des Moines Motor Sales Co., Peerless distributors, will, in the future, be known as the Des Moines Peerless Co. B. N. Mills and M. B. Seevers have recently acquired entire ownership of the company.

Leonard Brothers Garage, Inc., Windham, Conn., has been incorporated with an authorized capital stock of $50,000, according to papers filed with the secretary of state. Incorporators are Maurice S. Leonard, H. A. Bugbee, Raymond L. Angler, Albert Beck, Alexander Gelinas and P. L. Gagnon, all of this city.

The A. G. Graben Motor Co. has taken the Durant contract for Des Moines and Central Iowa. Harry Carr, for many years in the tire business in Des Moines, has been made sales manager.

The Des Moines Auto Exchange Co. will take over the entire building at Eleventh and Locust St., formerly occupied by the Franklin Motor Co.

Ross Walton Tire Co., distributor in the Philadelphia territory for Oldfield tires, has appointed as supervisor of commercial account sales, L. L. Evans, formerly of the Firestone Tire & Rubber Company, in Philadelphia.

William M. Moore Co., General Tire distributor, Philadelphia, has changed its name to the General Tire Company of Philadelphia, Inc. Announcement also is made of the withdrawal of William M. Moore from the company, which is the only change in personnel.

The Laster Reo Co., which recently took over the Reo in central Iowa, has moved into larger quarters at Fourteenth and Locust St., Des Moines, Ia.

Elmer Spangler, Decatur, Ill., distributor for the Moon car in the Macon county territory, has filed a voluntary petition in bankruptcy. He listed liabilities at $16,606 and assets at $2,810

Holly-Buick Co., of Aiken S. C., has been chartered, with a capital stock of $10,000. J. M. Holly is president and general manager.

Apperson Motor Car Co., Decatur, Ill., has leased the building at 224 East Wood street and will make extensive alterations, enlarging the offices and show rooms. A stock of accessories will also be carried. J. W. Bradley is manager of the company.

John B. Bliley & Son, Inc., Richmond, Va., has been chartered to do a general automobile and repair business. Capital is $25,000. John H. Bliley is president and Leo E. Bliley secretary.

Nelson-Mitchell Co., Milwaukee, Mitchell dealers and district distributors, has moved into permanent sales and service headquarters, but will continue its temporary quarters for used cars.

Eau Claire Automotive Sales Co., Eau Claire, Wis., has been incorporated with $50,000 capital stock by B. A. Flick, A. Jacobsen and Hugh Duffy to deal in new and used cars, automotive equipment, etc. It intends to build a new garage and service building in the spring.

Marvin & Gregory is the name of a new firm which has engaged in business as dealers and repairmen at Prairie du Chien, Wis. The partners are A. R. Marvin and Frank Gregory.

Atkinson-Nash Co., Sparta, Wis., is erecting a new sales and service building, 50 by 95 ft., two stories and basement, costing about $30,000 equipped.

Herrick & Sherman, Wisconsin Rapids, Wis., Studebaker and Reo dealers, have been succeeded by Earl Sherman, who purchased the interest of his partner, M. R. Herrick.

Auto Service Garage, Kewaunee, Wis., has been taken over by T. H. Lyons, who was associated for six months with the former owner, Joseph Salkowski. Mr. Lyons formerly was country service and salesman for the Knoller Electric Co. of De Pere, Wis., and previously in charge of tractor service for R. G. McGee & Sons Co.

Buege Motor Co., Marinette, Wis., Overland and Stephens dealer, has moved its garage and headquarters to Menominee, Mich., the twin city of Marinette. In the spring it will erect a new building in Marinette.

R. E. Newby, Buick dealer at Stevens Point, Wis., has purchased a new site and will build a $25,000 garage, sales and service building.

The Circuit Garage Co., Milwaukee, is a new $10,000 corporation formed by Theo S. Thompson, G. W. Neeb and Allen Bence.

Guy C. Ferre, Decatur, Ill., has moved into a new location and will distribute the Dodge Bros. car. Mr. Ferre attended the New York show and also the meeting of the Dodge Bros. representatives in that city.

Holloway & Huttes, Pana, Ill., have broken ground for a new accessory building and service station.

Wisconsin Steamers, incorporated for $50,000 capital, to act as distributor of the new Coats steam car in Wisconsin, has established offices and headquarters at 543 Broadway, Milwaukee, in charge of Joseph Bertsche.

E. A. Drott of Butternut, Wis., district distributor of the Holt Caterpillar tractor in a section of the northern Wisconsin logging and lumber manufacturing region, has been given additional territory to handle, for which he has established new headquarters at Rhinelander, Wis. Mr. Drott is a member of the Drott & Newell Lumber Co. The headquarters at Rhinelander will be in charge of Ray Boyd, who has been a member of the northwestern sales department of the Holt Mfg. Co. at Minneapolis for several years.

Oshkosh Truck Sales & Finance Corp. has been incorporated in Wisconsin to take over the Oshkosh Motor Truck Sales Co., which for some time has been handling the entire distribution of the products of the Oshkosh Motor Truck Co., Oshkosh, Wis., from headquarters in Chicago. The new company will have headquarters at the Oshkosh factory. J. E. Cummings of Milwaukee has been appointed general sales manager. A branch office will be maintained at Stevens Point, Wis., in charge of R. K. McDonald. The change is due largely to the development of plans whereby the new company will not only handle sales but finance purchases by its own means in behalf of customers.

W. E. Propst has been appointed manager of the Milwaukee branch of the Miller Tire Co., at 457 Milwaukee street, which distributes Miller tires in the Wisconsin and Upper Michigan territory.

The Bachman Motor Co., 242 Fourth street, Milwaukee, distributor of the Elgin Six and Dort, is erecting a new headquarters, sales and service building to cost $40,000, to be ready about March 1. It will be 122 ft., one-story and basement, and designed for three additional stories.

DEALERS WELCOME JEWETT

New York, Jan. 20—A large aggregation of Paige-Detroit dealers enthusiastically received the new Jewett six which was unveiled at their annual banquet Jan. 19. President H. M. Jewett of the Paige company, who was the speaker of the evening, announced that the price of the new car would be $1,065.

Mr. Jewett confined his remarks largely to the opportunity for the motor car dealer in 1922 and spread an atmosphere of optimism throughout the meeting. He declared the day of making big allowances on used cars to promote sales had passed and that henceforth only the soundest of business tactics would be employed. The financial condition of the Paige Detroit Motor Car Co., he declared, is sound.

New York Show Attendance Breaks Previous Records

Manufacturers Enthusiastic Over Conclusive Demonstration of Public Interest

NEW YORK, Jan. 20—From the standpoint of attendance, the New York automobile show, which closed Saturday night, was the most successful ever held in the United States. All records for paid attendance were shattered, contrary to expectations. The increase over last year was approximately 20 per cent and it was far in excess of 1920, which was the best previous year.

The attendance Thursday was the largest for any single day in the history of automobile shows. It was 4106 in excess of last year and 2210 ahead of the best previous day on record.

Another record which was broken was the attendance of dealers from the west. In previous years many dealers from Chicago have come on for the show, but the representation from other western cities, such as Kansas City and St. Louis, has been small. The reverse was true this year.

Manufacturers who attended the exposition were enthusiastic over the conclusive demonstration of public interest in automobiles. They would have been satisfied if the attendance had been no larger than last year and all of them were amazed at the number of New Yorkers who paid their money to get into the show.

Bankers interested in the automotive industry were equally enthusiastic over this feature of the exposition. They are more firmly convinced than ever that the motor vehicle has become an absolute essential in the life of the country and that it should be regarded by them hereafter in that light.

In fact, the show was a great success from every standpoint except that of sales. The first three days were entirely satisfactory in this respect, but the slump in the last three after the announcement by Dodge Bros. of its deferred price cut proved conclusively that the public expects further concessions.

ROAD EXHIBIT POPULAR

New York, Jan. 20—An exhibit which attracted much attention at the New York show was the booth conducted by the bureau of roads of the department of agriculture, in which were shown samples of road building materials, fac similes of road building machinery and photographs of improved highways. The exhibit attracted a great deal of attention, serving both to arouse the interest of car owners and prospective car owners in touring and to enlist support of the government's trunk line highway plans.

Ford-Lincoln Situation Holds Eyes of Industry

Lelands' 15 Models Expected to Be Continued Under New Plan But at Lower Price

(*Continued from page 29*)

hitherto by Henry M. Leland, the founder of the company.

The Lincoln plant, which is considered the finest of its kind in the world, has a potential capacity of 20,000 cars a year. Comparatively few changes will be necessary to put the plant on a Ford production basis and Ford engineers have been working on this problem for several months.

While he does not intend to sacrifice quality, it is believed Ford intends to bring into the manufacture of the Lincoln the same production and management methods which have made his cheap car such a success. Nothing radical is contemplated and it is not expected any material changes will be made in the immediate future. Preparations have been made to proceed with production as soon as Ford takes over control of the property. It can be stated that the present line of cars, which numbers fifteen models, will be continued.

The belief that Ford will have little competition in seeking to purchase the property is based largely upon emphatic denials made by other leaders in the industry that they expected to bid for the property at the receivers' sale. Among those who have been reported as interested in the property, but who assert there is no basis for such statements, are the banking interests back of the Hupmobile, and Mitchell, W. C. Durant and the Studebaker Corp.

If Ford is successful at the sale he will operate the Lincoln plant as a unit of the Ford Motor Co. The Lincoln car and the Lincoln company will retain their identity, however, and the management will be vested in Henry M. Leland and his son, Wilfred C. Leland, who operated the company before it went into the hands of the courts.

Nothing definite can be stated at this time as to what will become of the investments of the present stockholders. The Lelands stand to lose more than any other interest but they have urged that some means be found to protect from complete loss the interest of legitimate investors who staked their money on the reputation of the elder Leland, who is regarded as one of the "grand old men of the automotive industry" and who is held in affectionate esteem by the Fords.

It is recalled that in the early days of the industry there was in Detroit a firm called Leland & Faulkner which ran a machine shop. Next door to this shop was a little repair shop conducted by Henry Ford in which he was trying to build an automobile. Ford had to give up his shop when he reached the end of his financial resources. It was taken over by Leland who installed in it an engineer named Brush who was given instructions to continue the development of an automobile. Brush kept at work and built a car which was called the Cadillac.

Although he always has held the Lelands in high esteem, Ford was deaf for months to their appeal for assistance when it became apparent they would be unable to surmount the difficulties which confronted them after their plant finally went into production soon after the business depression really got under way. The negotiations with Ford were conducted by W. C. Leland. He had made his first appeal for assistance in June, 1921, but Ford declined to take on any new ventures at that time. He maintained this position in several subsequent interviews but in November told Leland to return when he and his father had lost everything.

This admonition was kept in mind by Leland and he went back to Ford after the receivership. All the facts in the case were presented to Ford and he then agreed to take over the company if he could obtain it for what he considered a reasonable price. So far as can be determined his only purpose was to aid the men who had devoted all their energies to the development of a highly respected enterprise and prevent its destruction. It is tacitly understood that the influence of Mrs. Ford and Edsel Ford was responsible for the decision of Henry Ford to back his friends.

The views of Ford on the Lincoln situation are contained in this statement by him:

"It would be a stain against the motor car industry and against Detroit to permit outsiders to secure control of the Lincoln plant merely because the Lelands have been caught in a financial pinch. Henry M. Leland is one of the great motor car men of America."

DALLAS SHOW DATE SET

Dallas, Texas, Jan. 20—The spring automobile show of the Dallas Automobile Trades Assn. will be held Feb. 20-25. This was decided at the last meeting of the association.

A better line of accessories will be shown in connection with the spring exhibit than has ever been seen in Dallas. Retailers expect the show to launch the spring buying move and they are predicting a big business will be done as a result of the show.

NO PLACE TO SHOW

Cedar Rapids, Ia., Jan. 21—Lack of adequate show room has caused Linn County Motor Trades Bureau to abandon plans for a spring show. It is probable that a week of display, with each dealer uniting in a spring showing, will replace the central exhibit.

Detroit Show Opens With 46 Exhibits; Large Attendance

D. A. C., Air Cooled Car In $1250 Class Is Shown to Trade For First Time

DETROIT, Jan. 21—Detroit's twenty-first automobile show was opened today in the Morgan & Wright plant of the United States Rubber Co. to a large attendance. There are forty-six makes of cars being exhibited, seventeen trucks, one tractor, one motor boat, and about seventy equipment exhibits. Admission prices have been reduced from 75 cents to 50.

The D. A. C. (Detroit Air-Cooled), is the only car being exhibited which is entirely new to the trade. This is a twin-three cylinder vehicle manufactured by W. J. Doughty, formerly Franklin distributor in Detroit territory. It will be sold in the touring model for $1250. Cars shown for the first time in Detroit are Gray, Rickenbacker, Durant, Wills-Ste. Claire and Rolls-Royce.

The Gray will be handled in Detroit by Charles E. Baker, who also holds the Dort franchise. Miller-Judd, Liberty distributor, is also showing the Peerless line, which has been recently added.

GRAMM TRUCKS LOWER

Lima, O., Jan. 21—Price reductions are announced on the various models made by the Gramm-Bernstein Motor Truck Co. The list follows:

	Old Price	New Price
Model 10—1 ton	$1365	$1365
Model 15—1½ ton	2050	1900
Model 65—1½ ton	2725	2500
Model 20—2 ton	3175	2925
Model 30—3 ton	.....	3275
Model 75—3½ ton	3275	4225
Model 40—4 ton	.....	3975
Model 50—5 ton	5275	4895

The name of the line has been changed to the "Gramm Pioneer," instead of "Gramm-Bernstein."

WINTON PRICES REDUCED

Cleveland, Jan 23.—Radical reductions in price, as much as $1950 on some models, have been announced by the Winton Co., to take effect at once

	Old	New
Touring	$4600	$3400
Roadster	4600	3400
Sport Touring	4975	3600
Victoria	5950	4000
4-pass. Sedan	5950	4450
Limousine	5950	4450
7-pass. Sedan	6200	4550
Limousine Sedan	6200	4700

MERIDEN'S FIRST SHOW

Meriden, Conn., Jan. 20—Meriden's first automobile show, Feb. 4 to 8 inclusive, at the local plant of the New Departure Co., promises to be a big success, judging from the rush of applications received by the committee.

CONCERNING MEN YOU KNOW

L. L. Bousquet, service manager for the Connecticut Valley Motor Sales Co., has opened a store in Springfield, Mass., for selling automobile parts at wholesale and retail.

R. B. Perry, who has been for the past six years connected with the Allen Motor Co. of Columbus, Ohio, has resigned from his position as director of sales and service with that company to become general sales manager for the Atlas Brass Foundry Co., also of Columbus.

A. R. Thompson announces that he has severed his connections with the Automobile Supply Co. of Detroit.

Frank H. Guilford has been appointed manager of the parts department of the Springfield (Mass.) Buick Co. He was formerly with a Boston establishment.

O. R. McDonald, well known to the trade, and some time ago connected with the Herring Motor Co. of Des Moines, and later with the Gibson Co. of Indianapolis, has joined the sales forces of the American Chain Co., with headquarters in New York.

G. A. Watson, formerly sales manager for the Western Motor Supply Co. of Minneapolis, has joined the Multibestos Co. of Walpole, Mass., makers of brake and clutch linings. He has been appointed district manager in charge of sales for the states of Iowa and Nebraska.

F. H. McKinney has been made truck sales manager of the Packard Co. at Detroit. McKinney comes from the Chicago branch of the company.

Elwood Haynes, president of The Haynes Automobile Company, Kokomo, Indiana, and the inventor of stellite, was elected to honorary membership in the American Society for Steel Treating at the recent Indianapolis Convention.

H. G. Evans has been appointed advertising manager of Winther Motors, Inc., Kenosha, Wisconsin.

Robert S. Brunhouse has resigned as vice-president and salesmanager of the Guy A. Willey Motor Co., Philadelphia distributor for the Paige car. With Oscar Collican, formerly manager for the Locomobile Company of America's Philadelphia branch, Brunhouse has formed Grant Motors, Inc., and will distribute the Grant car in Eastern Pennsylvania, Delaware, Maryland and Southern New Jersey.

Seiberling Rubber Co. has appointed J. E. Vail, for many years with the Goodyear Tire & Rubber Co., Philadelphia branch manager.

Arthur John Scanlon has been appointed district sales manager of the province of Quebec Ruggles Motor Truck Co.'s branch.

Ed. M. Wallace, formerly manager here of the Southern Oakland Co., Charlotte, N. C., and later in charge of the Scripps-Booth agency in Atlanta, has bought a half interest in the Oakland agency at Washington, D. C.

Henry Sheridan, foreign representative of the Avery Tractor Company, Peoria, Ill., has returned from a two year trip around the world, getting a line on export business, establishing agencies and booking orders for Avery products. He visited India, Malay, China, Japan, Australia, Persia, Philippine Islands, Hawaiian Islands, and various other countries of Asia, South America and Europe. While upon his tour he studied the condition of each nation from the material economic standpoint. He returns with an encouraging report upon trade conditions and believes that with proper effort manufacturers of the United States can vastly increase their exports.

Corlis G. Keyes, president of Keyes, Ltd., Ottawa, Ont., has been elected for a second term as president of the local Kiwanis Club having given "Service" during his previous twelve months presidency. He apparently gives them as good service as customers for automobile supplies receive in his store.

Guy H. Custin has been made manager of the retail sales department of the Ohio-Oldsmobile Co.

J. A. Ramsey, president of the Ramsey Accessories Manufacturing Co., St. Louis, Mo., has contracted for the entire output of the Kil-Nock Company, Inc., Davenport, Iowa, manufacturers of Kil-Nock Automatic Bearing Bolt.

Allen A. Ryan today resigned as director and chairman of the board of the Stutz Motor Car Co. to take a similar position with the Frontenac Motor Car Co., recently incorporated with a capital of $1,000,000. Other officers of the Frontenac company are Louis Chevrolet, vice president, and Kenneth R. Howland, secretary and treasurer.

Nich. A. Boehm, president-treasurer of the Wisconsin Brass Foundry Co., Milwaukee, has organized the Starcast Aluminum Co., with $10,000 capital, to engage in aluminum castings, with automotive requirements a specialty. Herman Beckman, superintendent of the Wisconsin company, is a co-incorporator with Mr. Boehm.

Earl J. Bullard, mechanical and automotive engineer, Madison, Wis., who recently was granted letters patent on a new design of piston ring, has organized the Bullard Mfg. Co. of Madison, with $25,000 capital to undertake the manufacture of the part. A plant will be established at once. Later the new concern expects to extend its activities to cover other automotive parts designed and patented by Mr. Bullard.

Albert S. Holly, formerly New England representative for the Pollack Tire Co., has been appointed sales manager of the Bridgeport Motor Truck Corp. of Bridgeport, Conn.

Harry Eisner has opened an automotive electric equipment station at Boston, Mass.

Harry P. Robinson, sales manager of the Frint Motor Co., Milwaukee, distributor of the Oldsmobile in Wisconsin and Upper Michigan, died Jan. 13, after a few hours' illness.

Dallas Dealers Agree to List All Used Car Sales

Dallas, Texas, Jan. 20—With a view of obtaining a more uniform price for used cars, and probably better prices, the Dallas Automobile Trades Assn. has adopted a policy of reporting sales of such cars to the members of the association. Under the new scheme, when a retailer sells a used car he reports the details of the sale to the secretary of the association. The secretary, in turn, sends to every member of the association a list of the used cars sold the previous day by other dealers. He may omit the dealer's name making the sales, but reports all other details. The association believes by this system it can arrive definitely at the amount of used car business as compared with the sale of new cars and probably bring about a standard of values for various makes and models, rather than having the cars and prices running wild on the market to the detriment of the business generally.

SEIBERLING NAMES PRICES

Akron, O., Jan. 20—The new cord tire invented by Frank A. Seiberling and to be manufactured ready for delivery at the Barberton, O., and New Castle, Pa., tire plants now controlled by the Seiberling Rubber Co. of Akron, will be placed upon the market on the following price basis:

The consumer price on the 30 x 3½ Seiberling clincher cord tire will be $12.50.

The prices on straight side Seiberling cord casings will be:

31 x 4	$29.90
32 x 4	32.90
33 x 4	33.90
32 x 4½	42.50
33 x 4½	43.45
34 x 4½	44.50
33 x 5	52.80
35 x 5	55.40

Petition Court to Continue Miniger's $240,000 Salary

Complainant in Willys Corp. Receivership Fears Loss Under Possible New Management

TOLEDO, Jan. 20—There is a possibility that Clement O. Miniger, president of the Electric Auto-Lite Corp., and one of the receivers for the Willys Corp., may not remain as head of the company if the Federal court does not allow a continuance of the agreement entered by him and the corporation Jan. 25, 1919.

This agreement makes his salary approximately $240,000 a year.

The Ohio Savings Bank & Trust Co., the compainant in the receivership proceedings, has moved the court to 'continue the salary and commission arrangement under which Miniger is working. The bank points out that the loss of Miniger to the company would mean a loss to the stockholders and creditors through possible loss of a lot of business now being done outside of the Willys-Overland accounts.

Under the agreement Miniger was to receive $60,000 annually, and 20 per cent of the net profits on sales, except the Willys-Overland sales. It was stipulated that the commissions should not exceed $150,000 a year for the first year, beginning Jan. 1, 1919, and not exceeding $190,000 the second year, beginning Jan. 1, 1920. He was to have a drawing account of $15,000 a month, but this was not to exceed the commissions for any one month.

NATIONAL FORD CHAMPIONS

Charlotte, N. C., Jan. 20—The Charlotte branch of the Ford Motor Co. won the company's national campaign for business during the month of December. Cars sold numbered 3549; tractors, 63. Territory of the branch includes both the Carolinas and southern Virginia. Jos. W. Holt is manager. Holt and other officials of the local branch are now taking a 10-day trip through the territory and will meet the dealers at central points where banquets will be held, the victory celebrated and plans for the future laid. Holt takes his victory as a good omen for business in the south. He says that if Ford cars can be sold oither things can be sold too.

YELLOW CAB DIVIDENDS

Chicago, Jan. 21—The Yellow Cab Co. has voted to place dividends at 33 1/3 cents monthly basis instead of a quarterly one. After Feb. 1, when a quarterly dividend of $1 a share will be paid, the rate will be 33 1/ cents a share monthly. John Hertz was re-elected president and Charles H. Ritter was elected treasurer and Edward N. D'Ancona, general counsel of the company, was made secretary.

Headlight Device Interests to Meet for Organization

Will Consider Joining M. A. M. A. As Separate Group or Forming Independent Body

NEW YORK, Jan. 21—Manufacturers of headlight devices for automobiles have been invited to send representatives to a meeting which will be held in the Old Colony Club at the La Salle Hotel, Chicago, Jan. 30, to decide whether to form a separate organization or to affiliate with the Motor & Accessory Mfgrs. Assn. as a group. Affiliation with the M. A. M. A. has been recommended by a committee which was appointed at a meeting of representatives of 10 manufacturers held here show week. Decision on the subject was deferred at that time because not all manufacturers invited to join in the movement were represented. Among the activities proposed either as a separate association or as a group of the M. A. M. A. is an educational and publicity campaign to teach public officials and the public generally something of the principles of headlight instruction and adjustment as a means of promoting safety.

Uniform Legislation Sought

Another proposition is that the manufacturers co-operate with the Society of Illuminating Engineers and the National Safety Council in an effort to obtain uniform state legislation in regard to headlights.

The chairman of the committee which is arranging the Chicago meeting is Fred H. Ford, of the C. A. Shayler Co. at Waupun, Wis. Manufacturers who wish to send representatives to the meeting are urged to communicate with him.

The wood wheel group of the M A. M. A., which succeeded the Wood Wheel Mfgrs.' Assn., has elected the following officers:

Chairman, Thomas A. White, president of Crane & MacMahon, Inc., St. Marys, Ohio; vice chairman, C. F. Field, general sales manager of the Hayes Wheel Co., Jackson, Mich.; secretary and treasurer, Phineas Jones, general manager of Phineas Jones & Co., Newark, N. J. The executive committee is composed of the officers and S. Vance Lovenstein of the Schwarz Wheel Co., Philadelphia, and A. E. Krick, vice president of the National Dry Kiln Co. of Indianapolis.

The leaf spring group of the M. A. M. A. is considering better methods of testing springs and spring metal with a view to establishing a uniform standard of tests throughout the industry.

TESTING NEW MOTOR FUEL

Detroit, Jan. 21—The Barnsdell Corp. of New York is working under a license from a syndicate headed by Frank F. Beall, vice president of the Gray Motor Corp. testing the commercial possibilities of a new motor fuel derived from crude oil. Beall says that, although the chemical results have been proved conclusively, the commercial possibilities have not been demonstrated and the results of further experiments will be awaited before an organization is formed by the syndicate now controlling it to market the product. It is expected the experiments will be completed early in February. Under the formula used, the oil is said to yield from 70 to 80 per cent of the motor spirit and if it works out commercially the price will be considerably lower than that of gasoline.

Iowa Official to Ask For Lower Car License Rates

Des, Moines, Iowa, Jan. 20—Walter C. Ramsey, secretary of state for Iowa, under whose department the automobile department of the state is handled, will ask the next session of the Iowa legislature for a material reduction in the amount of motor car licenses. Ramsey has called attention to the fact that Iowa, with the exception of Michigan, has the highest motor car license fee in the United States, and his suggestion is for a reduction of approximately one-third in the amount of the license. The present Iowa license is based upon one per cent of the manufacturers' list price plus 40 cents for each 100 pounds of weight of the car. Mr. Ramsey would lower the license by abolishing the one per cent assessment for the list price of the car and make the entire fee based upon the weight of the car.

MILWAUKEE PARTS MAKERS BUSY

Milwaukee, Wis., Jan. 23—Firms manufacturing parts, equipment and accessories for popular-priced passenger cars have large orders on hand for late winter and spring delivery, according to the monthly survey of Milwaukee industry and business contained in the current issue of Business and Financial Comment, published by the First Wisconsin National Bank, Milwaukee's largest financial house. It says, further, that the motor truck industry is still quiet, but "should receive stimulation from the prospective activities of building and construction this year."

TO IMPROVE SERVICE

Springfield, Mass., Jan. 21—At the annual meeting of the Automotive Service Assn. of Western Massachusetts, Jan. 16, measures were instituted to extend the organization's influence by enrolling more active members and through a series of meetings designed to enlist the interest and co-operation of service mechanics. These officers were elected: President, Harry Dobles, Packard Motor Car Co.; vice president, Nicholas J. Miller, Stoddard Motor Car Co.; secretary, Henry W. Lemay, Arrow Co.; treasurer, Howard B. Gates, Reo Springfield Co.

New York State Proposes Reshaped Automobile Laws

Recommendations To Be Submitted To Legislature After Careful Study by Solons

ALBANY, N. Y., Jan. 21—The joint legislative committee appointed last year to consider amendments to the laws affecting automobiles, of which Senator Seymour Lowman is chairman, will propose the following amendments in its report soon to be submitted to the legislature:

A one-cent gallon tax on gasoline.

Extending to up-state sections the law requiring the licensing of all automobile operators.

Increasing the motor truck registration fees in an effort to make motor truck owners pay for the damage it is claimed heavy vehicles do to highways.

Licensing of automobile repair men, garages and second hand dealers as a means of stopping the steadily growing automobile thefts.

Changing the basis upon which registration fees of cars are determined, because of the decline in the price of cars, it is found that owners of new cars, purchased at reduced prices, pay a smaller tax than those who bought their cars last year.

Creating a bureau of motor vehicle law enforcement agents in the state automobile department to co-operate with state troopers in rural districts.

GIANT INDIANAPOLIS CO.

Indianapolis, Jan. 21—By June 1, Indianapolis is promised a $700,000 garage and auto storage building of the latest type by a group of prominent local business men headed by Pres. Dick Miller of the Fidelity Trust Co., and William H. Barrere, Jr., secretary of the new Indianapolis Athletic Club. The five-story garage and storage building, which, it is said, can also accommodate shows and expositions, will adjoin the Indianapolis Athletic Club, now being erected at University Park, within two blocks of the heart of town. The building will face Illinois street, will accommodate at least 700 cars and will have stores for accessory shops as well as service stations.

DORRIS RE-ELECTS OFFICIALS

St. Louis, Mo., Jan. 21—At the annual stockholders' meeting of the Dorris Motor Car Co., held recently, the old officials of the company, which included George P. Dorris as president and chief engineer, Webster Colburn as vice president and general manager, J. F. Culver as secretary and treasurer, were re-elected for the ensuing year. Frank C. Thompson was elected second vice president.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

A Question of Priority of Lien Over Deed of Trust

Q—We repaired a car for one of our customers, the cost of parts and work amounting to about $65. We would not deliver the car to the owner until he paid for said work and parts. Another garage man in town held a deed of trust on said car and wanted to sell the car for his debt. We would not turn the car over to him until he paid our repair bill on the same. This he refused to do, saying that he came first.

The commonwealth's attorney came to us and told us to turn the car over to him, saying that he did not know whether he came first or we first, but would ask the judge, and if he said that we were due our money for the repairs before the man who held the deed of trust, he would see that he paid us. We have never been able to get the point settled as to whether we could hold the car for repairs and parts against the man who had the deed of trust. We would appreciate information as to this point and law for same,—People's Garage, Inc., Bedford, Va.

There are two lines of decisions on this point, one holding that the lien for labor and repairs takes priority over chattel mortgages and deeds of trust, and the other that they do not. That the lien is subordinate to a prior chattel mortgage or deed of trust, appears to be the decision of a majority of the courts of last resort in the United States. The point involves a constitutional question as urged in many of the decisions, and the Illinois Supreme Court in declaring the Garagekeepers' Lien Act invalid in the last January reports, 129 N. E. 133, says: "The lien of the mortgage is a vested property right of which the mortgagee and his assignee could not be deprived by legislative act." And it says further that to give the lien of the repairman priority would violate the obligation of a contract as guaranteed by the United States constitution.

Courts holding favorably to you base their decision on the ground that the mortgagor is the implied agent of the mortgagee to order repairs, etc., and therefore he is estopped to claim his right of priority. And there you are.

The Readers' Clearing House

THIS department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions by MOTOR AGE organization in conference.

STARTER COUPLING AIDS STARTING

Q—Is there any way of starting a Ford which is equipped with an Eisemann high tension magneto, type G-4, on battery or hot-spot. If there is a way, is it with or without coils? The trouble with this way is, I cannot spit it fast enough to start it on cold mornings. It is too stiff and is hard to get started on magneto only.—Samuel G. Hofer, Carpenter, S. Dak.

It is possible to convert this system into a dual or duplex system, but the cost would be approximately $30 to $35. We would recommend that you equip this magneto with an Eisemann impulse starter which retails for $8.25 and which gives the same effect as spinning the engine, although the starting crank need only be pulled up on the quarter turn. This coupling becomes an integral part of the regular magneto coupling and requires practically no attention and is inoperative after the engine is started.

KNIGHT VS. POPPET VALVE ENGINE

Q—Publish power and torque curves of the 1921 Stearns-Knight. Is this engine of the high or low-speed type?

2—Was the Mercedes car that DePalma drove in the 1915 race at Indianapolis equipped with a sleeve valve motor or one of the poppet valve type?

3—Has any car with Knight engine ever taken part in the big races, either here or in Europe? With what success?

4—Why is the "V" type engine not used in racing engines? Is it because the pistons are apt to wear oval?

5—How many high-grade European cars are equipped with Knight engines? —R. E. Gibbons, Cleveland, O.

1—This information is not available but we are under the impression that it develops approximately 45 h.p. at 1800 revolutions.

2—The Mercedes driven by DePalma in the 1915 race at Indianapolis was a poppet valve type.

3—The 1915 Indianapolis, Pillete driving a 15 h.p. Mercedes Knight, finished in the money.

4—Usually because most "V" type engines built to date are not eligible because of their cylinder capacity which is in excess of the 183 cu. in. limit. The wearing conditions are not factors at all. DePalma used a "V" type engine, in the Packard driven by him during 1919.

5—Approximately seven different makes used the Knight type engine in Europe.

H. C. S. CAR BEARS NO RELATION TO STUTZ

Q—Would like to know if the H. C. S. motor car and the Stutz motor car are made by the same company. If so, what is the difference between the two cars? —Tim F. Clark, Monticello, Ill.

The H. C. S. and the Stutz car are manufactured by entirely different companies. The Stutz uses a Wisconsin engine of special design, while the H. C. S., which is a smaller car, uses the Weidley engine.

FORMULA TO PREVENT ICE FORMING ON GLASS

Q—Supply formula for prevention of ice on windshields.—Loucks & Severlin, Skidmore, Mo.

A fairly successful remedy for the freezing of windows is the mixture of 55 grammes of glycerine dissolved in one litre of 62 per cent alcohol, containing, to improve the odor, some oil of amber. As soon as the mixture is clarified it is rubbed over the inner surface of the glass. This treatment, it is claimed, not only prevents the formation of frost but also stops sweating. Note, none of the formulae given herein are guaranteed to absolutely prevent frosting.

PROPER WAY TO SET FORD COMMUTATOR

Q—Advise proper way of gaging Ford commutator, that is, setting the control rod.—Johnston G. Craid, Kirkwood, Mo.

The method of setting the Ford commutator is to set it 2½ in. from the center of the commutator case spring cap screw to the center of the commutator case pull rod when the spark lever is fully retarded. The case should be set by the spark lever on the steering column to take up any lost motion. The adjustment is made by turning the rod in or out of the ball socket joint. If this adjustment is inadequate find the pull rod. The Ford supply a gage for gaging the commutator, the part number is 24Z1192.

WANTS SPECIAL PISTONS

Q—We are having trouble with timing gears on Federal trucks. They rattle continuously and I have installed new ones, but they will not last long until they are rattling again. How can this trouble be remedied? Would it be advisable to get special gears? If so, where can same be purchased? Am also having trouble with the compression on these trucks. I have had the block reground and fitted with new pistons and rings, allowing .001 gap on the rings for expansion. This does not give it good compression. I can hear the compression blow by the pistons. Would it be advisable to get special pistons with wider rings?—W. C. Rewer care of Magnolia Petroleum Co., Fort Smith, Ark.

The names of firms supplying special gears for this truck will be supplied you by special letter; .001 in. clearance is not enough for piston rings and it is possible that if you have allowed only this much clearance that the cylinders have become scratched or scored. We would not recommend rings of any larger width than the present ones as they are amply wide. We would suggest that you remove the cylinder block and note whether the cylinders are scored. The proper ring gap clearance should be .007 to .009 in. for this piston. If the rings are not seating properly it will be noticeable by dark spots on the face of ring.

READER WANTS CADILLAC POWER PLANT

Q—Advise where I could purchase a Cadillac unit power plant, model 57 or 59, and if you can, advise what a new plant would sost.

2—Where can I purchase a gas gage for the dashboard of a model 45-B, Oldsmobile. Are these gages a success; that is, do they record just how many gallons there are in the tank?—O. C. Sims, care of Strand Theater, Fort Dodge, Ia.

1—Regarding the purchase of a Cadillac eight power plant, we assume that you wish to purchase one that has been used. The most likely place to secure this would be from some of the leading car wrecking companies. Examine the classified advertising section of this magazine and if what you want is not listed, it probably could be secured if you would communicate with any of these companies by letter.

2—This will be answered by special letter.

HOT SPOT FOR 1913 HUDSON

Q—I am having trouble with a model 37 Hudson similar to the trouble experienced by J. Ketter, of Cleveland, O., with his 1914 Cadillac. As the intake manifold is very long and present gasoline not the same as of 1913, I believe a hot spot, as the one mentioned in your December 22 issue, would overcome my trouble. Furnish information as to where to obtain this hot spot.—Justus C. Weber, Closter, N. J.

The name of the firm manufacturing this hot spot will be supplied by letter.

SECURING PARTS FOR ARGONNE CAR

Q—Supply information as to where I could secure parts for an Argonne four.—C. G. Dailey, Danville, Va.

Brisk & Beckelman, 120 W. 31st street, New York City, at a receiver's sale bought the entire inventory of the Argonne company and have on hand service parts for practically every part of this car.

BUILDING PLAN SERVICE

AN ADVANTAGEOUS LOCATION FOR FILLING STATION

Q—Noting your plans in your magazine from time to time, I am taking the liberty of writing for the purpose of obtaining your advice regarding the building of a gasoline service station and ultimately a garage on a corner lot. The lot is 90 by 100 ft., facing north 90 deg. along University street, which is paved and carries quite a lot of traffic. The 100 ft. faces Sixth street. Four and Fifth streets carry the traffic out from town, turning to the right going on University, passing this corner on their right going out eastward.

This corner juts out in South University street, and this street is narrower.

It is my desire to so build the service station and such other shelter that later on I may incorporate the whole into an extensive garage, should business justify the extension.

I have thought of using the Navajo Indian style of building for exterior finish, similar to one seen in Santa Fe, N. M.

There is a hospital across the street from this lot and this may interfere with erecting a repair garage unless they will let me use the rear end down Sixth street for that purpose. It seems that they have objected to a garage here in the past.

Would prefer the oil container so could be gotten at from the outside, say with a window that could be raised up across the front over one side.

Expect to take your advice about shelter over one driveway but think a kind of porch effect part way over would help when it rains and not shade the light out much.

Do you recommend any special visible (glass jar) measuring pump?—A "Native Son."

This location is an exceptionally good one for a filling station; the jog being on the right hand side, one can drive directly in without crossing traffic. It is doubtful, however, if you will be able to get a permit to build a filling station if the authorities have already refused one for a garage. The principal objectionable noises around a garage are the blowing of horns and racing of engines when starting, and these would be present at a filling station as well as a garage.

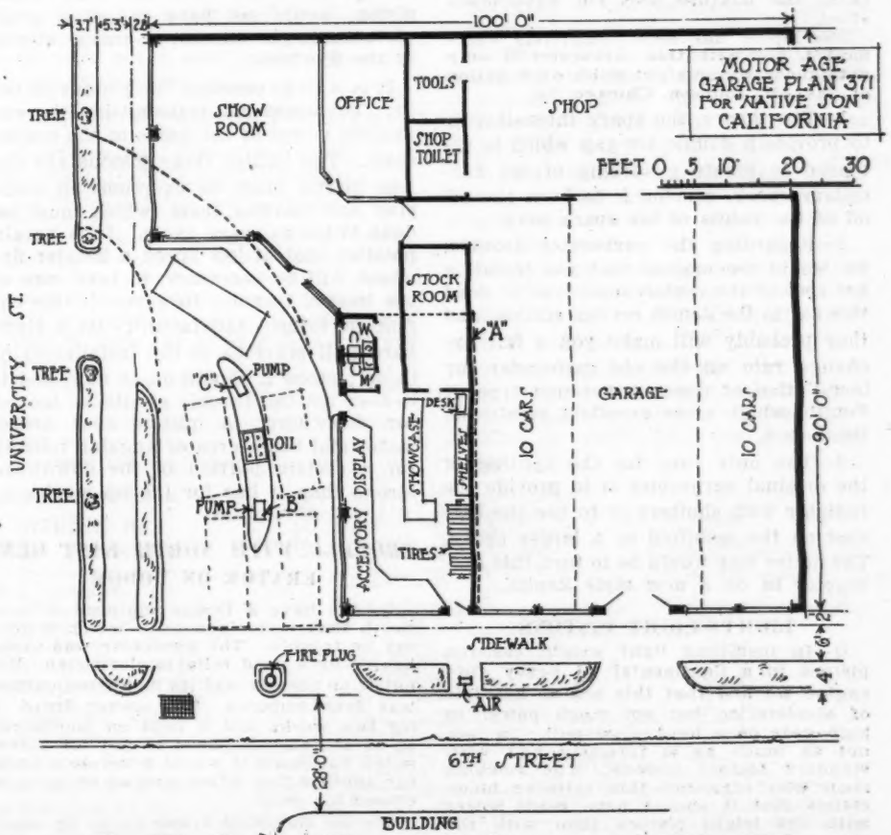
If you could build the part cut off by the dotted line A at first and add the remainder of the building when you start your garage business, you would have a very complete gasoline and accessory handling unit which would work into the new addition without alterations.

We have shown the station with two pumps, and think two could be operated to advantage, but the pump B should be installed first, then pump C could be added when trade demanded.

It is unfortunate that the fire plug is just where it is, perhaps it can be moved either to the front or further to the side.

The only objection to using the Navajo architecture is that show windows look out of place with it, and show windows are very essential to successful business.

A small cabinet of some sort, as indicated, containing oil pumps is the ideal way of handling oil, but faucets are some times used, fed by gravity from barrels.



Plan 371—Plan for a filling station and garage on a lot 90 by 100 ft.

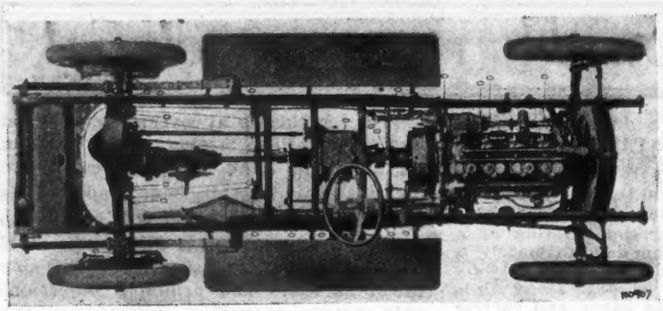


Fig. 1—Cadillac oiling chart

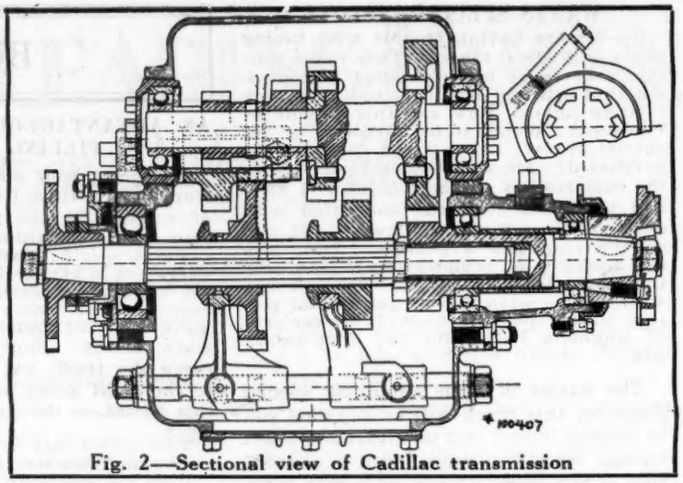


Fig. 2—Sectional view of Cadillac transmission

WIRING AND OILING OF 1914 CADILLAC

Q—Publish a diagram of rear axle and transmission and an oiling chart for the 1914 Cadillac touring car with two-speed rear axle.—Tire Service House, Sherman Foster, Prop., Oklahoma City, Okla.

A detailed drawing of rear axle, transmission and an oiling chart are shown in Figs. 1, 2, 3. The points marked "O" are places where oil should be used as a lubricant.

HOT-SPOTTING

Q—Explain how these spark transformers or intensifiers, which are attached to the spark plug, affect the running of the motor. Don't they have a tendency to retard the spark?

2—Also could you explain the following trouble with a 1015 6-40 Hudson which is equipped with a Zenith carbureter? In cold weather the motor has to be allowed to run at a fast idling pace for about 15 minutes before the carbureter will work properly enough to allow the motor to pull the car. When the car is started it goes along hitting on two or three until it becomes thoroughly warmed up. Richening the mixture does not have much effect.

The motor has been completely overhauled, but with this carbureter it only gets about six or eight miles on a gallon of gas.—M. Johnson, Chicago, Ill.

1—The theory, the spark intensifier is to provide a double air gap which is intended to create a surging of the secondary spark, causing it to burn the oil off of the points of the spark plug.

2—Regarding the carbureter trouble, we would recommend that you install a hot-spot of the replacement type or send this car to the Zenith service station, and they probably will make you a fair exchange rate on the old carbureter for installation of the new hot-spot type of Zenith, which gives excellent results on these cars.

3—The only cure for the spitting of the original carbureter is to provide the radiator with shutters or to use the hot-spot on the manifold or a larger choke. The better way would be to turn this carbureter in on a new style Zenith.

LIGHTWEIGHT PISTONS

Q—In installing light weight castiron pistons in a Continental C4 heavy duty engine we find that this engine has lots of acceleration but not much power in high gear on a hard, slow pull. In fact not as much as it formerly had with standard factory pistons. The machine shop who reground this cylinder block claims that it should have more power with the leight pistons than with the former factory pistons. I contend that by installing the leight weight pistons the flywheel momentum has been considerably reduced, consequently reducing your stored-up power in the flywheel at slow speeds. This machine shop operator contends that there is a difference in the relative speeds of the pistons in the engine, and I contend that a piston on explosion stroke travels faster for a certain space than the corresponding piston travels on the exhaust or compression stroke.—M. S. Varnado, care Chero Cola Co., Mobile, Ala.

Theoretically and practically, all other conditions being equal, the lighter the piston the more power should be derived from the engine. The difference between the light cast iron and the original type of piston should not be noticeable even on a slow, hard pull, as the extra inertia imparted to the flywheel by the heavy pistons shouldn't be as noticeable. The increased weight, which is no more than one pound more than the lightweight piston, would not have caused a great variation in the amount of energy stored in the flywheel.

It is well to consider the pistons as being the means for transmitting the expansive power of the gases to the crankshaft. The lighter these pistons are the less inertia must be overcome in stopping and starting them, which must be done twice to every cycle. It is barely possible that at low speed a heavier flywheel will be necessary, to take care of the lesseed torque. However, if this engine performed satisfactorily on a slow, hard pull previous to the installation of these pistons it should do so now, and if it does not the trouble should be looked for elsewhere. A piston does travel faster and has a greater angular velocity for a certain portion of the downward stroke than it has for the up stroke.

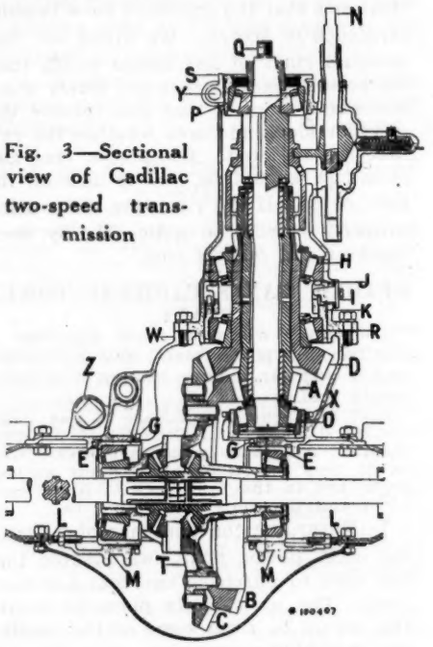


Fig. 3—Sectional view of Cadillac two-speed transmission

TROUBLE WITH NORTH EAST GENERATOR ON DODGE

Q—We have a Dodge equipped with a North East motor generator which is giving us trouble. The generator was overhauled by a good reliable electrician. We put it on the car and its maximum output was four amperes. The owner drove it for two weeks and it kept on increasing up to 10 amperes. Then it quit for a few miles, but again it would generate a little for another few miles, and so on until it ceased for good.

We set the third brush up to its limit. It would then generate its maximum and over, but if the brush was slightly moved back, the indicator would go back to zero. Driving along a road 5 to 10 m.p.h., the indicator showed 12 or more. Speeding up to 22 to 25, it goes back to zero again. The indicator hand also keeps fluctuating as if the commutator was uneven or badly fitted brushes. This, however, is not the case. This car has a new battery testing up good, the connections are all tight and clean and new fuses have been tried; the starter works well.—Reader, Ceresco, Neb.

We wish to call your attention to an article on the North East system installed on the Dodge Brothers car in the Dec. 1 issue of MOTOR AGE. The symptoms you describe in this system indicate either a defective cut out or some internal defects in the generator. We would recommend that you test the generator output at the generator before the current has traveled to the cutout. The generator should cut in at 1000 revolutions, or 9½ m.p.h.; at this point it should deliver three amperes; at 2400 revolutions the output should be 6½ amperes; at 1800 revolutions, seven amperes; at 3600 revolutions, five amperes. After the generator is removed, carefully examine and test the shunt field windings.

Tapered Cylinders Cause Engine to Pump Oil

Q—The diameter of the cylinders of a 1921 six-cylinder Model 37-A Oldsmobile measure 2.8145 in., which is about .002 in. oversize. Diameter of pistons at the skirt measure 2.805 in. Four cylinders are pumping oil, and upon measuring these I find that they slightly taper over the ring travel. Would you suggest regrinding the cylinders and fitting the blocks with new pistons?

2—Would you recommend the replacement of the aluminum pistons with light weight castiron pistons? Some people advise us to do this, while others tell me to stick to the aluminum pistons. What are the real facts in this matter?

3—Would you advise using a four-groove piston? What piston ring combination would you advise?

4—What is the proper piston clearance after the process of lapping in pistons?

5—After cylinder block has been reground, is it advisable to lap in pistons and piston rings in order to obtain a perfect job?

6—Give a brief description as to how to proceed in removing the cylinder block, especially relative to timing gears, distributer, camshaft and crankshaft.—E. A. Enderle, Dyneto Electric Corp., Syracuse, N. Y.

1—Yes.

2—The constant clearance type of aluminum pistons is giving excellent results and is in service on a number of cars. If you wish to retain the features of aluminum pistons we would recommend that you install this type of piston. The light weight castiron pistons also are very good.

3—Four-ring pistons are unnecessary if the pistons are properly fitted. A three-ring piston with a Welever piston ring is recommended by the Oldsmobile Service Station in this city. The top rings need only be of high grade manufacture and do not require any patented features. In summing up the merits of light weight castiron versus aluminum pistons, the aluminum piston makers claim the advantage of aluminum pistons have a greatr heat dissipating capacity regardless of their weight.

The light weight castiron manufacturers claim that these pistons can be fitted with the minimum amount of clearance, which will remain almost constant throughout periods of usage. This argument is met by aluminum piston manufacturers with the constant clearance type of aluminum piston, which comprises the new type of aluminum piston which is slotted in the skirt to compensate for the wide range of expansion to which aluminum is subject.

4—Approximately 1½ thousands per inch of piston diameter. For instance, if the bore is only three inches this would be 3 to .004 clearance of the skirt. This pertains only to the skirt, of course, and aluminum pistons even of the constant clearance type, the clearance at the top should be for an Oldsmobile approximately .019 at the first ring land and tapering down to .012 at tha third ring land. If you use aluminum pistons it would be well to get them finished from the manufacturer, who will have the proper clearances machined on the pistons when you receive them.

5—It is advisable to lap in the rings, although this is not necessary. We would not recommend lapping in the pistons.

6—Probably the best way to remove a cylinder block for regrinding is to remove the entire engine assembly and then disassemble the engine when the engine is out, either on an engine stand or on the bench. After the power plant has been removed the transmission and clutch should be removed. After the transmission has been removed the crankshaft bearings should be loosened and the crankshaft removed. Also the front timing gear case should be removed.

The timing gear case should be taken off before the crankshaft is removed, so that the marks on the gears may be noted. These marks will take care of the timing of the valves. There are no marks on the distributer gear and it must be timed by means of the flywheel after the engine is again disassembled. It is a very small job to do this and should cause no worry. Bearing caps can be removed very easily after the timing gear case has been removed.

When disassembling an engine with which you are not familiar, the best method to follow is to mark practically every part taken off so that it can be assembled in the same order. Don't go at the job hastily, but proceed slowly and cautiously on every operation. The timing of tha spark should occur about 1 in. after upper dead center on the flywheel. With the spark in the fully retarded position, the points should just open when the piston is 1/64 in. down on the power stroke, or approximately 1 in. past upper dead center measured on the flywheel rim.

TWELVE VS. SIX-VOLT SYSTEM

Q—Which will turn a car motor over the surest, the 6 or 12-volt starter?

2—Which has the most turning power, the 6 or 12-volt starter?

3—In a Dodge 12-volt system, which will last the longest, the 50 ampere hour or the 118 ampere hour battery?

4—Explain the difference, if any, in the spark produced by a 6 or 12-volt system—that is, does the 12-volt give a larger spark?

5—What is the difference in the power of the headlight of the 6 and 12-volt system? Does the 12-volt give a better light?

6—What changes must be made on the Dodge to get a more powerful light from headlamps?

7—Is there any system by which you could increase and decrease the light of the headlight?

8—What is the gear ratio of the Dodge starter?

9—What is the gear ratio of a Dodge three-speed and rear axle?

10—What is the highest revolutions per minute of the Dodge motor?

11—What horsepower does it deliver at highest motor speed?—Arnold C. Gunderson, Minneapolis, Minn.

1—The sureness of starting of any starting motor is not determined by the voltage, but by the design of starter. The voltagehas an important bearing on the over-all size of the starting motor.

2—The turning power is determined by the electromotive force exerted by the starting motor. The 12-volt system is usually used where the starter and generator are combined in a single unit and where the gear ratio of starter speed to crankshaft is low. The type of starter wherein the engine is driven through teeth or the flywheel permits of a great reduction is gearing with a consequent reduction in the over-all size of starter. In a starting circuit having a high resistance, the 12-volt system is employed because the higher voltage will allow current to flow without an enlargement of the cross-section area of the wires, windings, etc.

3—The 118-ampere hour battery will last longer than the 50-amper hour battery. Ampere hour rating is the ability to deliver a certain number of amperes for an hour an 118-ampere hour battery will deliver 118 amperes for one hour.

5—There is no difference, provided both lights are of the same candlepower.

6—This would necessitate either a change of bulbs to a higher candlepower or a change in the design of the lamp such as the reflector, which has much to do with the intensity of the light.

7—This could be accomplished by inserting a resistance in the headlight circuit connected to a variable switch.

8—Three to one.

9—The first speed gear ratio is 4.89 to 1. The second speed is 1.91 to 1; the reverse 3.4 to 1. The rear axle gear ratio is 4.166 to 1.

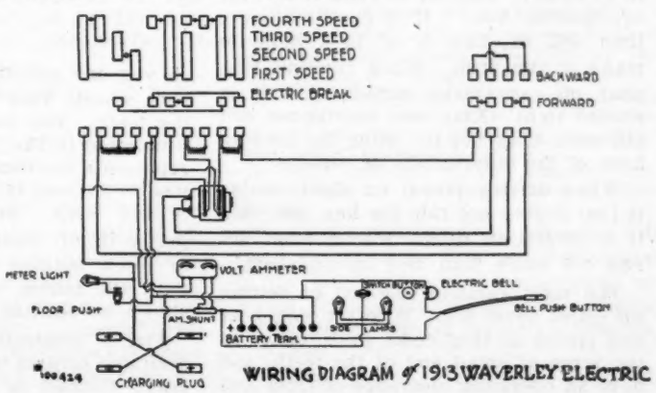
10—Approximately 2400.

11—It delivers approximately 25 hp. at 2400 r.p.m. The peak of power curve is 2200, at which time the engine develops 38 hp.

WIRING OF 1913 WAVERLY

Q—Publish wiring diagram for late model Waverly electric.—Automobile & Motorboat Co., Steubenville, O.

The last Waverly electric was produced in 1915. We are showing a diagram of the 1913 as the 1915 is not available.



WIRING DIAGRAM of 1913 WAVERLEY ELECTRIC

How to Correctly Adjust Rear Axle Gears

Q—Advise correct way to adjust rear axle gears.—Dr. Robb. S. Porter, Roanoke, Va.

In order that the spiral bevel ring gear and pinion may operate correctly, the rear axle must be in perfect alignment. That is, the differential axis must be in the same plane as the pinion axis. If there is any variation at all, the pinion axis must not be above the gear axis, as that would throw the contact or load on the heel of the tooth. It is very important that a careful inspection of the bearings be made before they are put back in their respective positions. If single row ball bearings are used, they may have a little angular movement, but must not have any radial play. By angular movement we mean a slight rock; an action which we get in a ball joint. By radial movement we mean straight movement up and down.

Care of Bearings

If the bearings are laid on a surface plate and you can move the cone straight over against the outer race and notice much play that way, the bearings should not be used. Also make sure that the balls are not damaged. If they spin freely no doubt they are all right. If the bearing sticks, clean it carefully with gasoline to make sure that all foreign matter is removed. Also try and keep them in a clean place.

If the bearings are of the roller type, examine the rolls and make sure they are not pitted or worn too bad. Also inspect the linings or cups which fit into the differential or pinion housing. If these are pitted or excessively worn they should be replaced with new parts.

Make sure that all parts which go on the inside of the gear housing are thoroughly cleaned. Any chips, grit or other hard substances grind out the bearings and gears very quickly. All studs and nuts must be a good fit in threads, so as to hold the gears and bearings in place. If these are loose they will let the gears vibrate and they will probably go to pieces in a very short time.

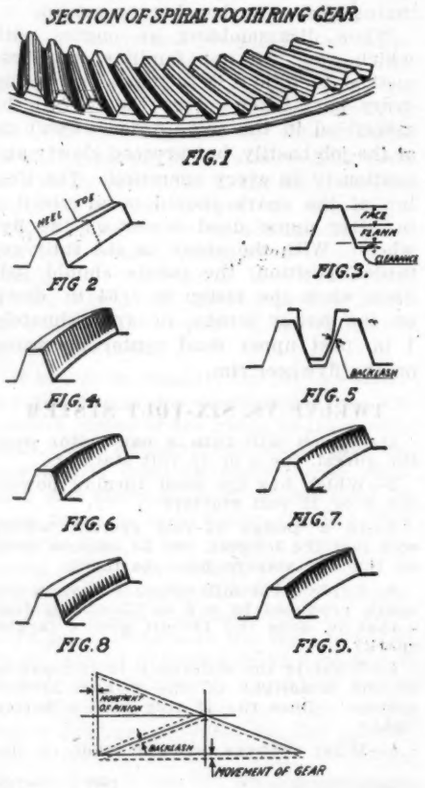
Rivet Ring Tight

In mounting ring gear on differential, inspect ring gear seat of differential case to determine whether it runs true with the bearing hubs. If it runs out more than .002 in., face it off in a lathe to make it run true. When riveting ring gear on case make certain that it is riveted tight. Ring gear should not run out more than .002 in., using the bearing hubs of the differentials as centers.

When driving pinion on shaft, see to it that it does not ride the key, also that it is driven on tight. Pinion must not run out more than .004 in. on shaft.

The most common method of setting up spiral bevel gears is to set ring gear and pinion so they come flush, either at the large or small end of the teeth, and have an operating clearance of from .005 in. to .008 in. For perfect adjustment, however, this method must be forgotten. An experienced mechanic can very often locate the proper running position by his sense of touch, but even that is not always dependable. This method is not correct at all times. It depends largely on the cut of the gear and the variation that takes place in its manufacture.

When the mechanic is ready to place the gears back into the axle, the best way to do is to roll the pinion around the ring gear by hand and note the position which the pinion takes at the large or small end, whether it sticks out or runs in. Assemble them in the axle as near as you can in that position, allowing from .005 in. to .008 in. back lash between them. Place the axle under the car, and at the same time paint the gear teeth with a thin coat of white lead. After this is done, jack up the rear wheels and start the engine, throwing transmission into high gear, also throw in your brake, which must be equalized



so you can get about the same load on each wheel. This will wipe the paint off the teeth. You may find a condition as illustrated in Fig. 9. The shaded portion represents the contact of the gear. That means the load is pulling on this portion of the teeth. In that case, move the pinion in, or toward the rear, two, three or more notches of the adjusting nut, until the pinion wipes off the paint as shown in shading on Fig. 4.

Fig. 4 illustrates what is termed as desirable contact on the spiral tooth ring gear. Contact as shown is just a trifle heavier on the toe of the tooth (Fig. 2) than it is on the heel. The heel of the gear tooth is the large end, and the toe is the small end. We intend to set the gears in this way, so as to be sure that we get an even contact when a full load is applied; the pinion in that case always having a tendency to lift. If one has a contact as illustrated in Fig. 8, or where the load comes on what is termed the flank of the gear tooth, it means that the pinion is too far in toward the axle. Gears set up in this way are noisy.

A Noisy Axle

To correct, pull pinion out until contact comes to the full working depth of gear tooth, without leaving lowest point of contact (see Fig. 4). If the contact is as shown in Figs. 8 and 9, it should only be changed by moving the pinion. If the load is centered in this place, you always find that you will have a noisy axle. Noise almost always can be eliminated by the pinion adjustment. If the contact on tooth appears as shown by shading in Fig. 6, it means that there is too much lash between ring gear and pinion. Gears set up this way will eventuallybreak off at the heel. To correct, move gear ring toward pinion, but make sure there is backlash, as gears cannot run tight. If the contact still shows heavy on the heel, the large end of the gear (see Fig. 2), change the gears. If you still have that contact, the axle is machined wrong or sprung.

Breaking at the Toe

Contact as shown in Fig. No. 7; that is, heavy on the small end, or the toe of the tooth, is not bad, although it doesn't want to be centered there too much. Gears set up this way will eventually break off at the toe. To correct, move ring gear away from pinion. Under no circumstances should the gear pass with a heavy contact on the heel. The lower figure illustrates two cones, which spiral bevel gears really are. It illustrates the difference you get in backlash, by moving either the ring gear or the pinion the same amount. For example, on a 4 to 1 gear ratio, it would be necessary to move the pinion four times as much as the ring gear, in order to get the same amount of backlash. So when it is necessary to increase or decrease backlash very much, it is best to try to move the ring gear. However, you can tell from your contact just which of the two gears to move.

When the gears are adjusted in this manner under the car, and you feel sure that you have them set up as good as you can make them, you may run the car out on the road and give it a one-mile test without putting oil in the axle housing. This will tell what can be expected, as far as noise is concerned. Oil will not deaden the noise very much; it only acts as a lubricant.

If you find it advisable to make fur-

ther adjustments to make the axle quieter, before filling up case with oil and turning car over to the customer, paint the gears up again and make certain that you have contact as illustrated in Fig. 4. Full tooth contact is necessary to carry the load.

While this method may seem complicated at first, with a little practice a good mechanic can set up gears in the above manner almost as easy as by guesswork, and it certainly will give much more satisfaction to the owner of the car.

WIRING PAIGE, GLENWOOD MODEL

Q—We have a Paige car No. 13736, chassis No. 13715. What is the make of the multiple disk clutch found on this car, and how may the slipping of same be corrected? Can it be that the cork inserts are worn out?

2—Publish complete wiring diagram for this car.—Victor G. Belknap, Omaha, Neb.

1—If the clutch pedal does not strike the floor-board and the clutch continues to slip, this is due to a clutch requiring cleaning or that the cork inserts have worn out. First make sure that the clutch pedal does not strike the floor-board. Also be sure that there is not over one pint of oil in the clutch. The lubricant for the clutch housing should be half cylinder oil and half kerosene. It should be thoroughly washed out previously with kerosene, and if the clutch continues to slip after this treatment has been given the cork inserts should be replaced.

2—This wiring diagram for this car is shown in Fig. 4.

CANDLEPOWER DEFINED

Q—In determining the candlepower of a light under different conditions what unit of measurement is their "candlepower" and what instrument do they use to determine it? I mean, for instance, what does this mean: "Above a 60-in. line at this distance the candlepower shall not exceed 18,000 c.p. nor below this 24,000 c.p." I am speaking, of course, about the new headlight laws and believe a short article on the subject would be timely.

2—What firm manufacturing an electric drill makes a good attachment for converting it into a sensitive drill on short notice?

3—Other conditions being equal, what is the most efficient form of valve position?

4—Who has built the highest actual horsepower motor in the 183 in. class? Furnish power curve.

5—What speed should a Monroe S do under favorable conditions? What changes do you suggest for higher speed?—A. Reader, Richmond, Ind.

1—Candlepower is a unit of measurement and is the ratio of the intensity of the light in question to the intensity of the light of one standard candle in one direction only, and will be the same in any other infinite number of directions in space. Candlepower, then, is no indication of the quantity of light, but only its intensity in any certain direction, regardless of the distance from the source. Illumination is the effect or result of light, and the unit for measuring illumination is the foot candle. The foot candle represents an intensity of illumination equal to that produced at a point on a plane which is one foot distance from a source of light equivalent to one candlepower, and which is perpendicular to the ray of light at that point.

Distance and candlepower have a direct bearing on the intensity of illumination. If the distance between the plane to be illuminated and the source remain the same and intensity of the source or the candlepower is changed, the intensity of the illumination or the foot candles will vary in the same proportion. If the candlepower remains the same but the distance between the source and the plane is doubled, the same quantity of light must cover four times as much surface. Briefly, then, the foot candles vary directly as the candlepower and inversely as the square of the distance between the source and the plane to be illuminated.

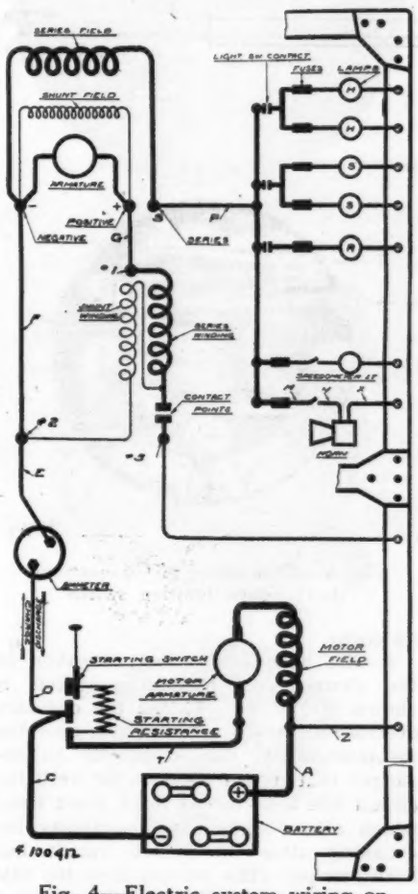


Fig. 4—Electric system wiring on Paige, Glenwood model

The average beam candlepower of the average automobile headlight is 30,000.

The headlamp candlepower, or foot candlepower, is measured by the foot candlemeter, which is a modification of the old-time photometer.

2—The Black & Decker Co., of Baltimore, Md.

3—Up to date the present trend seems to favor the valve-in-head type.

4—The power curves of the different racing engines are very difficult to secure, and we are unable to state which engine built the highest actual horsepower motor in this class.

5—Approximately 65 m.p.h. A camshaft with a higher lift. A general lightening and balancing throughout is about all to be recommended to increase the speed of this car. Much attention could be given to the chassis, which is a little too heavy for racing purposes with this engine. If the wheelbase were reduced and the chassis lightened up generally, we would expect a speed of 75 to 80 m.p.h. without any great changes made.

WOULD INCREASE POWER OF OVERLAND

Q—Is there any company that makes an overhead valve head for the Overland C C 90† If so, furnish the address.

2—Would an overhead valve give more power?

3—How could I get more power out of by Overland C C 90 engine?—J. D. Allen, Monmouth, Ill.

1—No.

2—Yes.

3—This would entail major changes in the engine, if a decided increase is desired. The better way would be to put the engine in tip-top shape without any change in its design. See if the cylinders are perfectly circular, and if they are not, have them reground and fitted with lightweight pistons. Grind the valves and balance all reciprocating parts carefully. This and a careful assembly of the parts will give the maximum performance that the engine is capable of.

COMPARISON OF STATIONARY AND AUTOMOBILE ENGINES

Q—Will a 25 Maxwell engine do the work of a 14 hp. stationary gasoline engine running a belt-driven pump?

2—What kind of governor is best to use on this engine, and where can I procure same?

3—Do you think it best to connect enup with a tank for cooling, or do you think the fan and radiator with small additional tank best to keep it cool? It has to run steady for eight hours.—F. H. Lanners, Del Norte, Colo.

1—Yes, if properly belted. The drive should be through countershaft in such a manner that radial strains are omitted from crankshaft bearings.

2—The names of firms supplying governor for automobile engines will be supplied you by special letter.

3—It would be alright to use the fan and radiator with a large auxiliary tank for water supply to cool this engine. If the pump driven is a water pump a very efficient cooling system could be made by shunting some of the water from the pump through the water jacket in the Maxwell engine which would eliminate the necessity for the radiator fan or tank.

KEROSENE AS AN ANTIFREEZE

Q—Can cylinder oil or kerosene be used successfully in radiator of a Ford car for short distance driving in winter?

2—Will kerosene and gasoline mix thoroughly so they can be used successfully in an engine designed to use either gasoline or kerosene?

3—Will cylinder oil and gasoline mix Permanently? — Arthur Nelson, Cherokee, Ia.

1—As a cooling medium kerosene will work alright but as it is very detrimental to the hose and rubber connections we would not recommend its use. A good substitute for alcohol is calcium chloride.

2—Yes.

3—Yes.

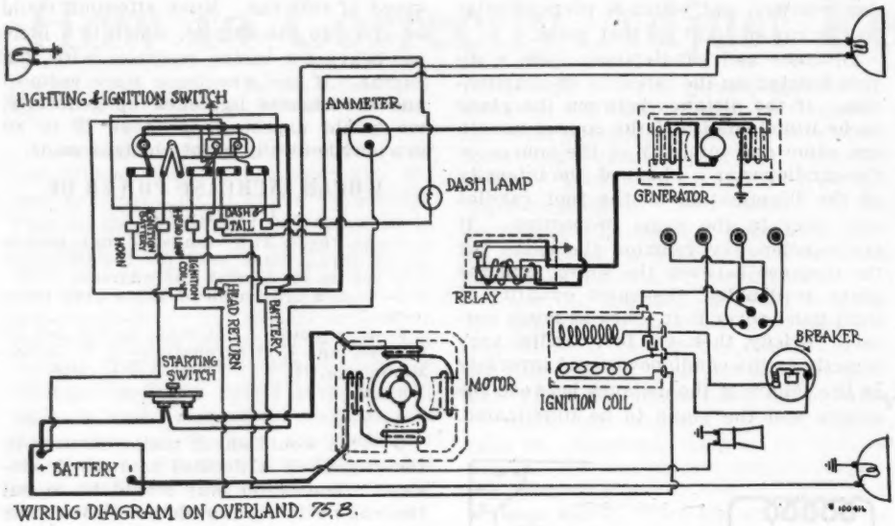


Fig. 5

OILING AND WIRING OF OVERLAND 75

Q—Publish wiring diagram of Overland model 75.

2—How can I ground generator to run engine on dry cells without battery in car? Publish illustration of this.

3—How do you oil clutch leather?

4—How do you oil clutch assembly and front universal?

5—What grade grease should be used for transmission and how much?

6—How much oil should be used for engine crankcase?

7—What level?

8—Explain action of igniting switch. I mean relay in switch box beneath ignition switch button on box.

9—Illustrate how to connect and where, six dry cells to run engine without regular battery.—D. H. Williams, Menan, Idaho.

1—The wiring diagram of the Overland, Model 75B, is shown in Fig. 5.

2—This generator is grounded by grounding the lead coming out of the generator to the frame of the generator. This is done by fastening a small wire to the nameplate and to the wire leading from the generator.

3—The clutch leather is oiled by depressing the clutch pedal. This will move the leather away from the flywheel, with the engine running, and with an oil can filled with neatsfoot oil squirt this oil copiously on the surface of the leather, letting the clutch out and in repeatedly to distribute the oil over the surface.

4—The clutch assembly is greased through the grease cup mounted on the clutch spider; this should be filled every 300 miles. The universal joint is provided with a removable cap which should be unscrewed and a quantity of grease forced in with a gun; this joint should be lubricated once every 3000 miles.

5—The transmission should be greased with 600-W or any semi-fluid oil in winter. It should be filled with this lubricant to a level corresponding with the bottom of the countershaft, approximately five pounds of oil being required for this.

6—The capacity of oil reservoir is five quarts.

7—This will bring it up to the top level registering full on the oil gage or tip-cocks.

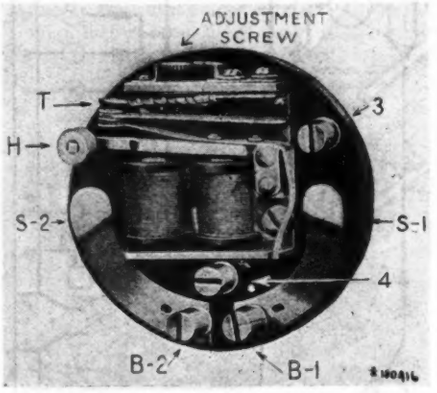


Fig. 6—Illustration of Connecticut thermostatic ignition switch

8—The automatic circuit breaker of the Connecticut automatic switch is shown in Fig. 6. Unlike the ordinary overload electrical cutout which operates instantaneously, this device is so arranged that it will not kick off until the circuit has been closed for a short time, which allows sufficient opportunity for cranking after the switch button has been pressed. The current from the battery enters at Post B-1 or B-2, and when the switch is closed at either post S-1 or S-2 flows to the thermostat, through the heater tap, which is coiled around the thermostat and then to Post 3. The amount of current passing when uninterrupted as when the motor is idle is far in excess of when the circuit is being interrupted, which occurs when the motor is running. The excessive flow when the motor is stopped causes the thermostatic arm to bend and make contact at point "T," thereby allowing the current to flow through the magnets and return to Post 4. This sets up a vibrator or hammer action in hammer "H," which drives away the retaining mechanism and unlocks the switch.

9—The six dry cells should be wired exactly as if the battery were installed. The positive wire from the six dry cells should go to the starter switch, and the negative to the starter. Of course, it is necessary to ground the generator, as before described.

SPARK TIMER ON REPUBLIC TRUCK

Q—Advise the distance in inches on the circumference of the flywheel where the breaker points should open, previous to compression dead center, on set spark magneto of 1917 two-ton Republic truck? —Ralph Panabaker, Dalton, Neb.

With No. 1 cylinder on the compression stroke and the mark on flywheel dead center one and four, in alignment with center line, place magneto, the breaker arm with the points wide open. This means that the magneto breaker fiber shoe should be exactly in the center of the cam. This is the method of timing used by the local Republican service station.

BUILDING STRAIGHT EIGHT FORD

Q—Could eight-cylinder Dixie magneto be used with Matco chain drive attachment on eight-cylinder in line Ford?

2—How should crankshafts be joined, could some sort of a universal joint be used? If not, give complete instructions for joining.

3—What kind of an oil pumping system should be used?

4—Give instructions for timing 1916 Jordan, Bosch magneto.

5—How can Auto-Lite generator on 88-4 Willys-Knight be set to throw heavier charge?

6—Are two sets of timing gears used in the straight eight Ford? If not how are camshafts connected?

7—Is there anything removed from the rear block?—Karl L. Schott, Clarksdale, Ariz.

1—Yes.

2—Usually the two crankshafts are connected by means of a flange coupling using the original flange on the front motor shaft and shrinking another on the front end of the rear motor shaft, bolting the two together.

3—A gear or plunger type of pump is necessary to secure lubrication for this engine, or a full pressure system could be used if two hollow crankshafts are utilized.

4—Turn the engine over slowly until the marks on the flywheel upper dead center 1 and 6 coincide with the pointer on the crankcase housing. Note whether both valves are closed on No. 1 cylinder; if both are closed, No. 1 cylinder is on its firing stroke. When the engine is in this position turn the magneto armature until the secondary distributer brush is on the segment of No. 1 post, which can be any one of the six, it is entirely a matter of your own choosing. However, if the wires are already on the distributer block, bring the distributer brush to the segment that would correspond to the No. 1 wire leading to No .1 spark plug; then, with the spark retarded, turn the armature until the points have just started to break. Connect the couplings and the engine is timed.

5—The output of this generator can be varied slightly by increasing the brush pressure.

6 and 7—This information is not instantly available, but can be secured from the makers of this engine, Battle & Hubbard, Dallas, Tex.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

THE DEGLARESCOPE

The Deglarescope is composed of a series of laminated glass planes, approximately one-half inch wide, ground and polished and assembled in a metallic housing. It fits into any lamp and prevents the projection of upward rays, regardless of the focal position of the source of light, or the intensity of the same—yet it does not interfere with the projection of the direct, or horizontal, rays. The upward rays being reflected down onto the road assure perfect lighting directly in front of the car, while non-interference with the direct, or horizontal rays, assures illumination for a great distance ahead. The cut shows how this is accomplished.

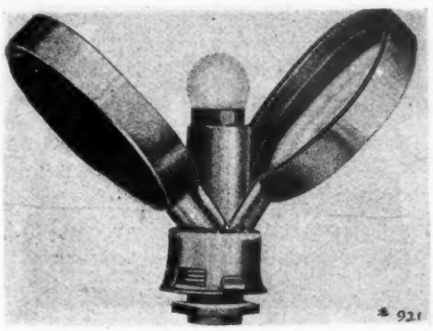
All direct, or horizontal, rays (A-B) pass through clear polished glass. These are the distance rays. All upward rays (A-C) strike a polished, mirror-like surface, and are reflected downward at the same angle (C-D). All downward rays strike a non-reflecting surface to prevent upward reflection. Price $7.50 per set. Deglarescope Co., 1310 Maple street, Detroit.

"ROLL-ON" JACK

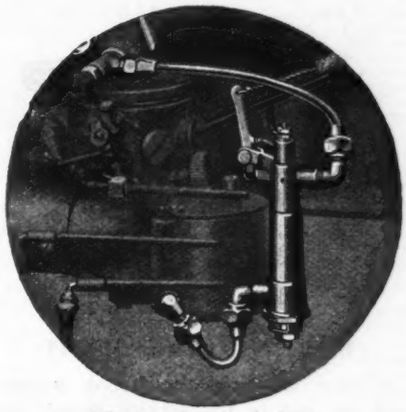
The "Roll-On" jack, pictured here, is inserted between the spokes and when the car is reversed either by hand or power it slips into place, so that the car is ready for removing the tire or locking. The jack is strong and durable, and no pumping or lifting is necessary, and when once on the jack, the car will not fall off of its own accord. Schlangen Bros. Co., Chicago.

SHARPE WINDSHIELD CLEANER PAD

The Sharpe windshield cleaner pad has a cloth that has been chemically treated, and, when rubbed on the glass, the property imparted to it prevent rain or snow from adhering to the glass and obscuring the driver's vision. The pad is made in a convenient size for the car owner's pocket or car pouch. Price $1. Sharpe Chemical Co., 403 Stevens bldg., Detroit.



Parking lamp



Master electrical timer

Sun automatic spark regulator

"Roll-On" jack

MASTER ELECTRICAL PRIMER

The Master electrical primer is an electrically heated vaporizer acting as a kind of auxiliary carbureter to effect instantaneous starting regardless of cold weather or low grade gasoline used. It takes the gasoline direct from the carbureter, heats it to a dry vapor by drawing it over a red-hot electric coil and turns it into the manifold.

It is operated by pulling a button on the dashboard. Contact having been made and the needle valve drawn into its seat by the same movement, the suction of the motor is applied to the inner chamber of the primer. Releasing the button automatically breaks connection.

The design has been changed so that there are no live wires under the hood of the car, except when the primer is actually in operation—a period of approximately seven seconds. The switch on the dash now makes electrical contact and at the same time opens the vapor outlet to the manifold, making the operation as safe from fire as the horn or ignition. Master Primer Co. 130 Larned street, Detroit.

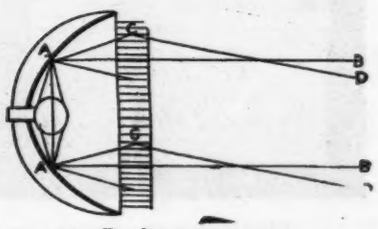
SUN AUTOMATIC SPARK REGULATOR FOR FORDS

The Sun automatic spark regulator is made in two parts, the automatic feature and a shell similar in appearance to that of the regular Ford timer.

The automatic feature, shown in the lower of the two illustrations, is an adaptation of the tested principles of governors and centrifugal force. Two weights, whose position shifts with the speed of the engine, automatically advances or retards the spark. By preventing a spark before the piston reaches dead center, back-kick is made absolutely impossible. The retail price is $4.75. Sun Auto Products Co., Cincinnati.

ALLAN PARKING LAMP

This parking lamp is equipped with full 3⅛ in. unbreakable lens, is made entirely of heavy brass, nickel plated and is operated by pushing down ferrule, catch and turn. Price, complete with bulb, $3. Allan Parking Lamp Co., Baltimore, Md.



Deglarescope

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

ELECTRIC BATTERY OPENER

The Schreader electric battery opener, which is 14 in. high, 15 in. wide, 26 in. long, constructed of 24-gauge copperoid metal, cover lined with asbestos and painted inside and out with acid resisting paint, will open all batteries in a few minutes. Can be used on 110 or 220-volt, A. C. or D. C. Price $27.50. J. E. Schraeder, Crookston, Minn.

THE BI-JET CAR WASHER

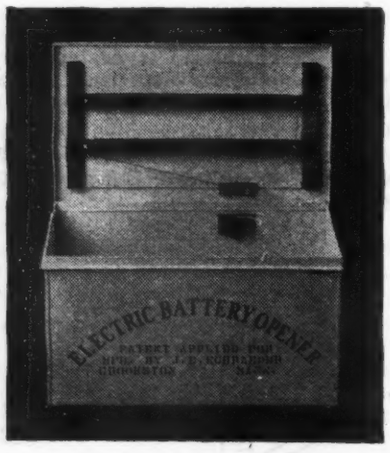
A device used for car washing which is attached to any hose and which sends out two jets of water, swift flow. The Bi-Jet is an English product and is intended to be especially useful in cleansing the parts of a car which are hard to reach. The cut will explain the functioning. Bi-Jet Co., Lechtworth, Herts, England.

CALDBECK BATTERY PARTS MOULDS

This company manufactures a complete line of moulds for battery parts. The moulds are carefully machined with proper draft, to make a smooth casting. Following are listed the various designs:

Connector mould.
Combination terminal mould.
Sealing collar mould.
Screw mould.
Burning strip mould
Combination mould.
Three cavity connector mould.
Cable terminal mould.
Pillar post mould.
Slotted pillar strap mould.
Lead washer mould.
Six cavity screw mould.

Caldbeck Tool & Mfg. Co., Des Moines, Iowa.

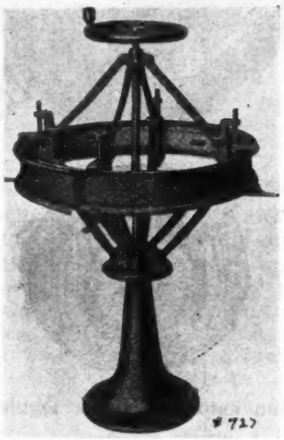


Electric battery opener

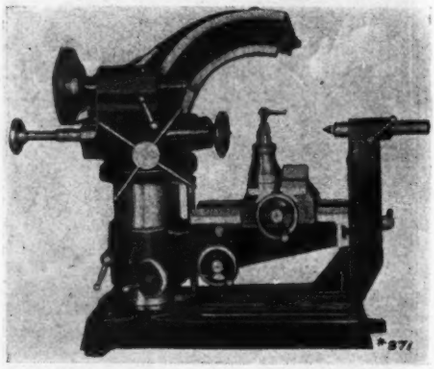
Bi-Jet car washer

MILBURN GARAGE OUTFIT

A new welding and carbon burning unit for use in the service garage and machine shop is the Milburn "American" garage outfit for oxy-acetylene welding and carbon burning. The cut illustrates the various parts and appliances which comprise this outfit. The cost of the complete outfit is $55; this includes all of the 16 accessories, etc., which are pictured here. The outfit is manufactured by the Alexander Milburn Co., 1428 W. Baltimore St., Baltimore, Md.



Hudson tire changer



Triplex machine tool

TRIPLEX MACHINE TOOL

The Triplex No. 1 combination machine tool conveniently does turning, milling and drilling. The spindle bearings of this machine are made tapered and are adjustable for wear. All the bearings are of phosphor bronze and are provided with oil grooves to insure proper lubrication. All gears are of steel and the spindle and tailstock are made from alloy steel and accurately ground. All feed screws are provided with micrometer dials to obtain precision adjustments.

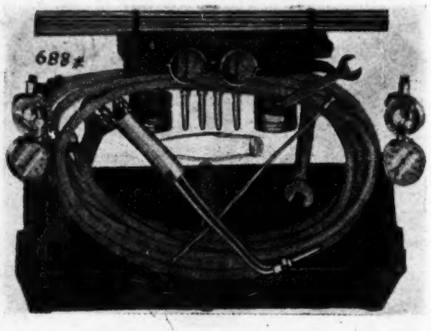
Graduations, in inches per foot, are provided for turning tapers and, in degrees, for swiveling the bed. The carriage can be locked in any position and the spindle head is tightened on the radial arm by a single nut. The spindle head is counterbalanced by a counterweight in the vertical column. The construction of the machine is such that all similar parts are fully interchangeable.

An interesting feature of the Triplex is its size, the working table dimensions being 5 by 14½ inches, while the bench space is 16 by 30 inches.

The price of the Triplex machine is $485, extra equipment such as floor stand, milling and drilling vise, milling arbor, etc., not included. (Extra equipment is manufactured by the company.) The regular equipment, included in this price is ¼ hp., reversible, direct or alternating current motor, slotted dog driving plate, centers, tool post and wrench. Triplex Machine Tool Corp., 18 E. 41st St., New York.

HUDSON TIRE CHANGER

The cut will probably tell all there is to be told regarding this tire tool which will remove a tire from any rim providing the rim is split. The rim is simply set on the vises, which are tightened, drawing the rim smaller, when the tire is slipped off. The same operation, reversed, is applied when a tire is placed on the rim. Hudson Products Corp., Portland, Ore.



Milburn garage outfit

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador.....R	Cont.	6-3⅝x5¼	136	33x5	....	†4500	$4500	....	$6500
American.....C	H-S.	6-3¼x5	127	32x4	$2195	2195	†2250	....	3150
Anderson.....Series 40	Cont.	6-3¼x4½	120	33x4	2195	1650	1795	$2450	2550
Apperson.....8-21-S	Own.	8-3¼x5	130	34x4½	....	2620	2645	3625	3695
Auburn. Beauty-Six. 6-51	Cont.	6-3¼x4½	121	32x4	1575	1575	1615	2275	2395
Auburn.....Beauty Six	Cont.	6-3¼x4½	121	32x4½	....	†2195	....	....	....
Beggs.....20T	Cont.	6-3¼x4½	120	33x4	1775	1520	....	2320	2420
Bell.....4-32	H-S.	4-3½x5	114	31x4	....	1195	....	....	....
Bell.....6-50	H-S.	6-3¼x5	124	32x4	....	1545	....	....	....
Biddle.....B1 & B5	Buda.	4-3¾x5½	121	32x4	3475	†3475	....	4350	....
Brewster.....91	Own.	4-4 x5½	125	32x4½	†6000	6000	....	....	9200
Buick..1922-34-35-36-37	Own.	4-3⅜x4¾	109	31x4	895	935	....	1295	1395
Buick.....1922-44-5-6-7	Own.	6-3⅜x4½	118	33x4§	1360	1395	....	1885	2065
Buick.....1922-48-9-50	Own.	6-3⅜x4½	124	34x4½	....	....	1585	2075	2375
Cadillac.....61	Own.	8-3½x5½	132	33x5	3100	3100	3150	3925	4100
Case.....X	Cont.	6-3½x4½	122	32x4½	....	1890	....	....	2790
Case V.....V	Cont.	6-3½x5¼	126	34x4½	....	....	1935	‡2585	2990
Chalmers.....6-30	Own.	6-3¼x4½	117	32x4	1245	1295	1395	1905	2295
Chalmers.....6-30	Own.	6-3¼x4½	122	32x4	....	....	1395	....	....
Champion.....Tourist	Lyc.	4-3½x5	113	32x3½	....	995	†995	....	....
Champion.....Special	H-S.	4-3½x5	118	32x4	†1095	1095	....	....	....
Chandler.....Six	Own.	6-3½x5	123	33x4	1595	....	1695	2295	2395
Chevrolet.....490	Own.	4-3⅛x4	102	30x3½	525	525	....	875	875
Chevrolet.....FB	Own.	4-3⅛x5¼	110	32x4	975	975	....	1575	1575
Cleveland.....40	Own.	6-3 x4½	112	32x4	1175	1195	....	1550	1595
Climber Four.....K	H-S.	4-3½x5	115	33x4	1385	1385	....	....	....
Climber Six.....S	H-S.	6-3¼x5	125½	32x4½	2250	2250	....	3000	3100
Cole.....890	Nort.	8-3½x4½	127¼	33x5	2485	†2485	2485	3385	3685
Columbia Challenger....	Rut.	6-3½x5	115	32x4	....	1195	....	†1995	1995
Columbia.....D-C&CS	Cont.	6-3¼x4½	115	32x4	1475	1475	†1475	†2295	2350
Comet.....C-53	Cont.	6-3½x5¼	125	33x4½	....	2350	2450	....	3650
Commonwealth.....44	H-S.	4-3½x5	117	32x4	....	1395	....	....	2465
Crawford.....22-6-40	Cont.	6-3½x5¼	122½	32x4	2750	2750	2750	....	4500
Crow-Elkhart....L63-65	Lyc.	4-3½x5	117	32x3½	†1095	1095	....	....	....
Crow-Elkhart....S63-65	H-S.	6-3¼x5	117	33x4	1345	1345	....	....	2095
Daniels.....D-19	Own.	8-3½x5¼	132	34x4¼	†5350	†5350	5350	6250	6950
Davis.....61-67	Cont.	6-3¼x4½	120	33x4	†1895	1795	†1895	2595	2595
Dixie Flyer.....H-S-70	H-S.	4-3½x5	112	32x4	1195	1195	†1395	1895	1895
Dodge Brothers.....	Own.	4-3⅞x4½	114	32x4	935	985	....	1585	1785
Dorris.....6-80	Own.	6-4 x5	132	33x5	....	†4785	4785	5800	7190
Dort.....19-14	D-Ly.	4-3½x5	108	31x4	985	985	....	1535	1685
Driggs.....	Own.	4-2⅞x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg...Straight 8	Own.	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont.....A	Own.	4-3⅛x5½	124	32x4½	3000	3200	....	3800	4000
Durant.....A-22	Own.	4-3⅞x4¼	109	31x4	....	890	....	1365	1365
Durant.....B-22	Anst.	6-3¼x4½	123	32x4½	1600	1650	....	2250	2400
Earl.....40	Own.	4-3 7/16x5¼	112	32x4	1485	1185	....	....	1895
Elcar.....K-4	Lyc.	4-3½x5	118	33x4	†1095	1095	‡1095	1345	....
Elcar.....7-R	Cont.	6-3¼x4½	118	33x4	1395	1395	‡1395	2165	2065
Elgin.....K-1	Falls.	6-3¼x4¼	118	33x4	1345	1295	†1345	2195	2195
Essex.....	Own.	4-3⅜x5	108½	32x4	1095	1095	....	1345	1895
Falcon.....4	Own.	4-3½x5	115	32x4	1295	1295	....	1900	2085
Falcon.....6	Own.	6-3½x5	115	32x4	1595	1595	....	2295	2395
Falcon, H.P.M...12-D22	Own.	4-2⅞x4	100	27x3½	2800	†3000	....	....	4000
Ferris.....Series 60	Cont.	6-3½x5¼	130	32x4½	2575	....	2475	....	3475
Ferris.....Series70	Cont.	6-3⅝x5¼	130	32x4½	2895	....	2795	....	3895
Ford.....T	Own.	4-3¾x4	100	30x3½	**319	††348	....	580	645
Franklin.....9-B	Own	6-3¼x4	115	32x4	2300	2350	....	3200	3350
Gardner.....T-R & G	Lyc.	4-3½x5	112	32x3½	895	895	....	....	1595
Grant.....	Own.	6-3⅛x4½	116	32x4	1385	1385	....	1895	1945
H.C.S.....	Weid.	4-3⅝x5½	120	32x4½	2725	†2775	....	3450	3650
Handley-Knight.....	Kn'ht.	4-4½x4½	125	32x4½	....	....	2650	3750	3750
Hanson Six.....60	Cont.	6-3¼x4½	121	32x4	1595	1595	1795	†2475	2585
Hatfield.....A-42	H-S.	4-3½x5	115	32x4	†1345	1345	....	1950	1950
Haynes.....75	Own.	6-3½x5 1/16	132	34x4½	2595	†2395	2395	....	3395
Haynes.....55	Own.	6-3½x5	121	33x4	1645	1595	....	2295	2595
Haynes.....48	Own.	12-2¾x5	132	34x4½	4200	3635	3635	....	4950
Holmes.....Series 4	Own.	6-3½x4¼	126	34x4½	†2950	....	2950	3850	4150
Hudson Super 6.....	Own.	6-3½x5	126	34x4½	†1095	....	1745	2570	2650
Huffman.....R	Cont.	6-3¼x4½	120	32x4	1845	1795	....	....	2795
Hupmobile.....Series R	Own.	4-3¼x5½	112	32x4	1250	1250	....	1835	1935
Jackson.....638	H-S.	6-3¼x5	121	32x4½	†2285	1635	....	2985	2985
Jordan.....MX	Own.	6-3 1/16x4¾	120	32x4	2095	2095	....	3200	3200
Jordan.....F	Cont.	6-3½x5¼	127	32x4½	....	....	2475	....	3500
Kenworthy.....8-90	Own.	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
Kessler.....K	Own.	4-3¾x3¾	117	32x4	....	1995	....	....	2445
King.....K-1922	Own.	8-3 x5	120	32x4½	2140	†2125	*2125	3125	3235
Kissel.....45	Own.	6-3 7/16x5½	124	32x4½	2675	2675	2175	3275	3475
Kline Kar.....6-55-K	Cont.	6-3¼x4½	121	33x4	1890	1890	1890	3050	3090
Kurtz Automatic.....A	H-S.	6-3¼x5	122	32x4	....	2050	....	....	3000
LaFayette.....134	Own.	8-3¼x5½	132	33x5	3985	4090	4090	5000	5175
Leach.....999	Own.	6-3¼x5¼	134	32x4½	6500	6500	6500	6500	6500
Lexington.....Series S	Anst.	6-3¼x4½	122	32x4	....	1985	....	....	2285
Lexington.....Series T	Anst.	6-3¼x4½	128	32x4½	....	....	2785	....	3750
Liberty.....10-C	Own.	6-3½x5	117	32x4	1295	1295	†1495	2085	2245
Liberty.....10-D	Own.	6-3½x5	117	33x4½	....	....	....	2085	2245
Lincoln.....	Own.	8-3⅝x5	136	33x5	4600	4300	4300	4950	5400
Locomobile.....48	Own.	6-4½x5½	142	35x5	....	†7600	7900	10500	11000
Maibohm.....B	Falls.	6-3½x4½	116	32x4	1395	1395	†1495	2165	2165
Marmon.....34	Own.	6-3¾x5⅛	136	32x4½	†3700	3900	3700	4700	5150

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Maxwell.....Series	Own.	4-3⅝x4½	109	31x4	$ 885	$ 885	....	$1385	$1485
McFarlan.....1921	Own.	6-4½x6	140	33x5	6300	†6300	$6300	7500	7500
Mercer.....Series 5	Own.	4-3¾x6¾	132	32x4½	3950	†3950	*3950	4850	5250
Merit.....	Cont.	6-3¼x4½	119	32x4	†1985	1985	....	....	....
Meteor.....R & RR	Dues.	4-4½x6	129	32x4½	5500	5500	....	....	....
Mitchell.....F-50	Own.	6-3½x5	120	33x4	‡1490	1490	†1790	2290	2440
Mitchell.....F-50	Own.	6-3½x5	127	33x4	....	....	1795	....	....
Monroe.....1922-S-13	Own.	4-3¼x4½	115	32x3½	1295	1295	....	....	....
Monroe.....1922-S-14	Own.	4-3¼x4½	115	33x4	....	....	....	2075	2175
Moon.....6-48	Cont.	6-3¼x4½	122	32x4	1785	1785	2285	2785	2785
Moon.....6-68	Cont.	6-3½x5¼	125	32x4½	....	....	2285	....	....
Murray-Mac Six.....	Own.	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash.....681-7	Own.	6-3¼x5	121	33x4	1360	1390	†1540	....	....
Nash.....682	Own.	6-3¼x5	127	34x4½	....	....	1540	2090	2390
Nash Four.....41-4	Own.	4-3⅜x5	112	33x4	1025	1045	....	1645	1835
National.....BB	Own.	6-3½x5¼	130	32x4½	2990	†2990	2990	4140	4240
Noma.....3C	Bea...	6-3¼x4½	128	32x4½	2000	†2100	*2200	....	3200
Noma.....1D	Cont.	6-3½x5¼	128	32x4½	3000	†3100	*3200	....	5500
Norwalk.....430-KS	Lyc.	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland.....6-44	Own.	6-2 11/16x4¾	115	32x4	1120	1145	†1265	1685	1785
Ogren.....6-T	Cont.	6-3½x5¼	134	33x5	†4250	4250	4375	5200	5500
Oldsmobile.....43-A	Own.	4-3 11/16x5¼	115	32x4	†1145	1145	....	1645	1795
Oldsmobile.....46	Own.	8-2⅞x4¾	122	33x4½	....	†1735	1735	....	2635
Oldsmobile.....47	Own.	8-2⅞x4½	115	32x4	1595	†1595	....	2145	2295
Overland.....4	Own.	4-3⅜x4	100	30x3½	595	595	....	850	895
Packard.....Single-Six	Own.	6-3⅜x4½	116	33x4½	2350	2350	....	3125	3350
Packard.....Twin Six	Own.	12-3 x5	136	35x5	4850	4850	4850	6600	6800
Paige.....6-44	Own.	6-3½x5	119	32x4	1465	1465	....	1995	2245
Paige.....6-66	Cont.	6-3¾x5	131	33x4½	‡2245	‡2495	2195	3100	3155
Pan American.....6-55	H-S.	6-3¼x5	121	33x4	2000	2000	2100	....	....
Paterson.....650	Cont.	6-3⅜x4½	120	32x4½	....	1550	1585	2595	2595
Peerless.....56-S-7	Own.	8-3⅜x5	125	34x4½	....	†2880	2880	3500	3790
Piedmont.....4-30	Lyc.	4-3½x5	116	32x3½	....	970	....	....	....
Piedmont.....6-40	Cont.	6-3¾x4½	122	32x4	....	1285	....	....	....
Pierce-Arrow.....	Own.	6-4 x5½	138	33x5	7000	†6500	6500	8000	8500
Pilot.....6-50	H-S.	6-3½x5	126	32x4½	2285	2285	2375	3350	3400
Porter.....46	Own.	4-4 x6¾	142	35x5	6750	6750	6750	....	7800
Premier.....6-D	Own.	6-3⅜x5½	126¾	33x5	3150	3100	3250	....	5000
Premocar.....6-40 A	Falls.	6-3½x4¼	117	32x4	1295	1295	....	1945	1995
R & V Knight.....R	Own.	4-3¾x5	116	32x4	....	1850	....	2650	2750
R & V Knight.....J	Own.	6-3½x5½	127	32x4½	2750	2750	2750	3350	3450
Reo Series...B-T6 & U6	Own.	6-3 5/16x5	120	33x4	1595	....	1595	2355	2435
ReVere.....C	Dues.	4-4½x6	131	32x4½	3200	3200	3200	....	4000
Rickenbacker.....	Own.	6-3½x3¾	117	32x4	....	1485	....	1885	1935
Roamer.....6-54-E	Cont.	6-3½x5¼	128	32x4½	2850	2585	†2750	3850	3850
Roamer.....4-75-E	Dues.	4-4½x6	128	32x4½	3985	†3585	†3750	....	†4650
Rolls-Royce.....	Own.	6-4½x4¾	143½	33x5	U. S.	Chassis	Price	11750	....
Romer.....R-22	Cont.	6-3¼x4½	120	33x4	1975	1975	2050	2400	2700
Saxon.....125	Own.	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six.....DP	Cont.	6-3¼x4½	118	33x4	1695	1695	....	2795	2795
Seneca.....L & O	LeR.	4-3¼x4½	108	30x3½	945	945	....	....	....
Southern Six.....660-2	H-S.	6-3¼x5	127	32x4½	2375	2375	2395	....	....
Sperling, A.....	Supr.	4-3⅝x5	114	32x4	980	980	....	1685	1685
Standard.....J	Own.	8-3¼x5	127	34x4½	2500	†2500	2500	3250	3500
Stanley Steamer.....	Own.	2-4 x5	130	34x4½	2800	2600	2600	3775	3850
Stanwood Six.....	Cont.	6-3¼x4½	118	33x4	1765	1765	....	2750	....
Stearns.....SKL4	Own.	4-3⅜x5⅝	125	34x4½	2250	2250	2450	3150	3450
Stephens.....90	Own.	6-3¼x4½	122	33x4½	1675	†1745	*1745	2650	2650
Stevens-Duryea.....E	Own.	6-4 7/16x5½	138	35x5	7250	†6000	6800	....	†8900
Studebaker....Light Six	Own.	6-3½x4½	112	32x4	1045	1045	....	1375	1750
Studebaker...Special Six	Own.	6-3½x5	119	32x4	1425	1475	†1475	2150	2350
Studebaker.....Big Six	Own.	6-3⅞x5	126	33x4½	....	....	1785	2500	2700
Stutz.....	Own.	4-4⅜x6	130	32x4½	2950	†2990	*2990	3990	4450
Templar.....A-445	Own.	4-3⅜x5½	118	32x4	1985	1985	....	2785	2785
Texan.....A-38	Lyc.	4-3½x5	115	33x4	1195	1195	....	....	....
Texan.....C-12	H-S.	4-3½x5	115	33x4	1350	1350	....	....	....
Tulsa.....E-1-2-3	H-S.	4-3½x5	117	33x4	1175	1175	....	....	....
Tulsa.....F-1	H-S.	6-3½x5	119	33x4	1585	1585	....	....	....
Velie.....48	Cont.	6-3¼x4½	115	32x4	1585	1585	†1800	2485	2485
Velie.....34	Falls.	6-3½x4½	112	32x3½	1235	1235	....	1750	2085
Velie.....58	Own.	6-3½x4¼	115	32x4	1395	1395	....	1995	1995
Vogue.....6-55	H-S.	6-3¼x5	124	32x4	....	1885	1960	2785	2885
Vogue.....6-66	Cont.	6-3½x5¼	124	33x4½	....	2085	2160	2885	2985
Waltham.....6	Own.	6-3½x5	120	32x4	2350	....	2350	3050	3150
Washington.....	Cont.	6-3¼x4½	116	32x4	....	1785	....	....	....
Washington Jr.....	Falls.	6-3½x4¼	116	32x4	....	1635	....	....	....
Westcott.....C-48	Cont.	6-3½x5¼	125	32x4½	....	2090	2090	....	3490
Westcott.....A-44	Cont.	6-3¼x4½	120	32x4	1890	1890	†2190	2890	2890
Wills Sainte Claire..A-68	Own.	8-3¼x4	121	32x4½	2875	2875	....	3750	4100
Willys-Knight.....20	Own.	4-3⅝x4½	118	33x4	1475	1525	....	2195	2395
Winther.....61	H-S.	6-3½x5	120	32x4½	....	....	2250	....	....
Winton.....25	Own.	6-3¾x5¼	132	35x5	4600	†4975	4600	5950	†5950

*—6-passenger. †—4-passenger. ‡—3-passenger. **—Price without starter and demountable rims. Price with starter and demountable rims $420. ††—Price without starter and demountable rims. Price with starter and demountable rims $450.

Engine Make: Anst—Ansted. Bea—Beaver. Cont—Continental. Curt—Curtiss. D.Ly—Dort Lycoming. Dues—Duesenberg. H-S—Herschell-Spillman. LeR—Leroy. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenberg. Weid—Weidely. Wisc—Wisconsin.

§Model 47—34 x 4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾	$1650§	3¾x5	34x5†	34x5†	W
Acason, R	1	2260	3¾x5¼	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5¼	36x3½	36x6	W
Acason, H	2½	3295	4½x5¾	36x4*	36x8*	W
Acason, L	3½	4295	4½x5¾	36x5*	36x10*	W
Acason, M	5	5250	5 x6¼	36x6	40x12	W
Ace, C	1½	2295	3¾x5⅛	34x3½*	34x5*	W
Ace, A	2½	2795	4¼x5½	36x4*	36x7	W
Acme, G	¾	....	3¾x5	35x5†	35x5†	W
Acme, B	1	....	3¾x5	34x3½	34x5	W
Acme, F	1½	....	3¾x5	34x3½	34x5	W
Acme, A	2	....	4½x5¼	36x4	36x7	W
Acme, AC	2½	....	4½x5½	36x4	36x7*	W
Acme, C	3½	....	4½x5½	36x5	40x10	W
Acme, E	5	....	4¾x6	36x6	40x12	W
Akr'nMulti-Trk20	1¼	1695	4 x5¼	34x5	34x5	B
American, 25	2½	3350	4 x6	36x4*	36x4d*	W
American, 40	4	4275	4½x6	36x5*	36x5d*	W
Apex, G	1	1450††	3½x5	33x5†	33x5†	I
Apex, D	1½	1915	3¾x5⅛	34x3½	34x4	I
Apex, E	2½	2695	4¼x5½	36x4	36x7	I
Apex, F	3½	3975	4½x6	36x5	36x10	I
Armleder, 20	1	....	3¾x5¼	34x3½*	34x5*	W
Armleder, 21	1¼	....	3¾x5¼	34x3½	34x6	W
Armleder, 40	1½	....	4½x5¼	34x3½	36x6	W
Armleder, HW	2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW	3½	....	4½x6	36x5	36x5d	W
Atco, B	1½	....	3¾x5¼	34x5†	36x6†	W
Atco, B1	1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A	2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D.	1	1185	3½x5	32x4½†	32x4½†	W
Atterbury, 20R	1¼	2475	3¾x5	34x3½	34x5	W
Atterbury, 7CX	2½	3175	4½x5¼	36x4	36x4d	W
Atterbury, 7D	3½	3975	4½x5½	36x5	40x5d	W
Atterbury, 8E	5	4975	4¾x6	36x5	40x6d	W
Autocar, 21UF	1½-2	1950	4¾x4½	34x4*	34x5*	D
Autocar, 21UG	1½-2	2050	4¾x4½	34x4*	34x5*	D
Autocar, 26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar, 26-B	5	4100	4¼x5½	34x6	36x12	D
Availzble, H1½	1½	2475	4 x5⅛	36x3½*	36x5*	W
Available, H2	2	2775	4 x5⅛	36x3½*	36x6*	W
Available, H2½	2½	3475	4 x5⅛	36x4*	36x8*	W
Available, H3½	3½	4475	4½x5½	36x5	40x5d	W
Available, H5	5	5375	4¾x6	36x6	40x12	W
Available, H7	7	6000	5 x6	36x6	40x14	B
Avery	1	....	3 x4	34x5†	34x5†	I
Beck, A Jr.	1	1950	3¾x5	34x3½	34x4	I
Beck, C	2	2550	4½x5½	36x4	36x6	I
Bell, M	1	1495	3⅝x5⅛	35x5	35x5†	W
Bell, E	1½	2100	3¾x5¼	34x3½	34x5	I
Bell, O	2½	2550	4½x5½	34x4	34x6	I
Belmont, D	2	2675	3¾x5	34x3½*	34x6*	D
Belmont, F	3½	3525	4 x6	36x5*	36x5d*	D
Bessemer, G	1	1395	3½x5	35x5†	35x5†	I
Bessemer, H-2	1½	1995	3¾x5	36x3½	36x5	I
Bessemer, J-2	2½	2595	4½x5¼	36x4	36x4d	I
Bessemer, K-2	4	3495	4½x5½	36x5	36x10	I
Big 4, H	3½-4	5000	4½x6	36x6	36x6	W
Big 4, T	4	5500	4¾x6	36x6	36x6	W
Big 4, K	7	6000	5½x6	36x6	36x6	W
Big 4, HA	7	6000	4½x6	36x6	36x10	W
Brinton, C	1½	1500	3¾x5	34x4	34x5	W
Brinton, F	2½	2250	4½x5¼	36x4	36x7	W
Brockway, E	1	....	3⅝x5⅛	35x5†	35x5†	B
Brockway, S-4	1½	....	3¾x5	36x3½*	36x5*	W
Brockway, K-S	2½	....	4½x5½	36x4	36x8	W
Brockway, R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway, T-4	5	....	4¾x6	36x6	40x6d	W
Capitol, G1½	1½	2975	3¾x5	35x5	38x7	W
Capitol, H2½	2½	3700	4¼x6	36x4	36x8	W
Capitol, K2½	2½	4250	4¼x6	36x6	42x9	W
Capitol, M3½	3½	4425	4¼x6	36x5	36x10	W
Case, ††	2	3000	4¼x5¾	36x6	38x7	I
Champion Light Commercial	½	1195	3½x5	32x3½	32x3½	I
Chevrolet, G	¾	745	3¼x4	31x4½	31x4½†	B
Chevrolet, T	1	1125	3¼x5¼	33x4†	35x5†	W
Chicago, C1½	1½	....	3¾x5⅛	36x3½*	36x5*	W
Chicago, C2½	2½	....	4 x5⅛	36x4*	36x7*	W
Chicago, C3½	3½	....	4½x5½	36x5	36x10	W
Chicago, D5	5	....	4½x5½	36x6	40x12	W
Climber, A-20	1½	2450	3½x5	36x6*	38x7*	I
Clydesdale, 18	¾	1890	3¾x5	34x5	34x5	W
Clydesdale, 32C	1	2375	3¾x5⅛	34x3½*	34x5*	W
Clydesdale, 42C	1½	2475	4 x5⅛	36x3½	36x5	W
Clydesdale, 65C	2½	3250	4¾x5½	36x4	36x7	W
Clydesdale, 65EC	2½	3150	4½x5½	36x4	36x7	W
Clydesdale, 90C	3½	4100	4½x5½	36x5	40x10	W
Clydesdale, 120C	5	4500	4¾x6	36x6	40x12	W
Collier, 18	1	2350	3¾x5	34x4	34x5	W
Collier, 19	1½	2550	3¾x5	36x4	36x6	W
Collier, 21	2	2950	4½x5¼	36x4	36x7	W
Collier, 22	2½	3250	4½x5¼	36x4	36x4	W
Columbia, H	1½	2350	3¾x5	35x5†	34x5	I
Columbia, G	2½	2850	4 x5¼	36x4	36x7	I
Comet T	1½	1950	3¾x5	34x4	34x4	W
Commerce, T	¾-1½	1450	3¾x5	31x4½†	34x4½†	B
Commerce, 12	1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16	2	2150	3¾x5	35x5†	35x6†	I
Commerce, 18	2½	2495	4½x5¼	36x6†	36x7†	I
Concord, A	2	3150	4 x5½	36x3½	36x6	W
Concord, B	3	3600	4¼x5½	36x4	36x8	W
Concord, AX	2	3250	4 x5½	36x3½	36x6	W
Concord, BX	3	$3600	4½x5½	36x4	36x8	W
Cook, 41	2	3000	4 x5½	36x6†	38x7†	I
Corbitt, H-22	1	1480	3¾x5	34x3½	34x4	W
Corbitt, E-22	1½	2200	3¾x5	34x3½	34x4	W
Corbitt, C-22	2	2600	4½x5¼	36x3½	36x6	W
Corbitt, B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt, R-22	3	3200	4½x5½	36x4	36x8	W
Corbitt, A-22	3½-4	3800	4½x5½	36x5	36x10	W
Corbitt, AA-22	5	4500	4¾x6	36x6	40x6d	W
Day-Elder, A	1	1600	3¾x5	34x3½	34x4	W
Day-Elder, B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder, D	2	2400	4½x5¼	36x4	36x7	W
Day-Elder, C	2½	2750	4½x5½	36x4	36x7	W
Day-Elder, F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder, E	5	4250	4½x6	36x5*	40x6d*	W
Dearborn, E	1	1700	3⅝x5⅛	35x5†	35x5†	W
Dearborn, FX	1½	2300	3¾x5⅛	34x4	34x5	W
Dearborn, F	1½	2180	3¾x5⅛	34x4*	34x5*	W
Dearborn, 48	2	2590	3¾x5⅛	35x5†	34x7†	W
Defiance, G	1	1695§	3¾x5	35x5†	35x5†	I
Defiance, D	1½	2095§	3¾x5	35x5†	36x6†	I
Defiance, E	2	2275§	3¾x5	35x5†	38x7†	I
DeMartini, 1½	1½	2600	3¾x5	34x3½	34x6	W
DeMartini, 2	2	3300	4 x5½	36x3½	36x7	W
DeMartini 3	3	4250	4¼x5½	36x4	36x10	W
DeMartini 4	4	4800	4½x6	36x5	36x12	W
Denby, 31	¾	1485	3½x5	35x5	35x5	B
Denby, 33	1½	2145	3¾x5	35x5†	38x7†	I
Denby, 34	2	2395	3¾x5	36x3½	36x6	I
Denby, 25	3	3300	4½x5¼	36x4	36x7	I
Denby, 27	4	3895	4½x5½	36x5	36x5d	I
Denby, 210	5	4295	4½x5½	36x6	40x6d	I
Dependable, A	¾-1	1650	3⅝x5⅛	34x5	36x6	W
Dependable, C	1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D	2	2650	4 x5½	34x5	36x6	W
Dependable, E	2½	2950	4½x5½	36x4	36x7	W
Dependable, G	3½	3550	4½x6	36x6	38x7	W
Diamond T, O	1–1¼	1975	3¾x5¼	36x3½†	36x4†	W
Diamond T, FS	1½	2525	3¾x5¼	36x3½	36x5	W
Diamond T, T	1½	2250	3¾x5¼	36x3½	36x5	W
Diamond T, U	2	2650	4 x5¼	36x4	36x7	W
Diamond T, K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T, EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T, S	5	4500	4¾x6	36x6	40x6d	W
Diehl, A	1	....	3½x5	34x4½	35x5	I
Diehl, B	1½	....	3½x5	36x6	36x6	I
Dispatch, F	1	1350	3¾x5	34x4†	34x4†	I
Doane	2½	4100††	4¼x5¾	36x5	38x7	C
Doane	3½	5100††	4½x5¾	36x5	36x5d	C
Doane	6	6000††	5 x6½	36x6	40x6d	C
Dodge Brothers	½	885	3⅞x4½	32x4†	32x4†	B
Dorris, K-4	2–2½	3400	4¼x5½	36x4	36x7	W
Dorris, K-7	3½	4400	4¼x5½	36x5	36x10	W
Dort, 103	½	685	3½x5	31x4	31x4	B
Double Drive B	3	4000	4¼x5½	6	6	W
Douglas G	1½	1850	3¾x5⅛	36x5	37x8*	W
Douglas I	3	2950	4¼x5½	36x6	37x8*	W
Duplex, A	1½	2775	4 x5¼	35x5†	38x7†	W
Duplex, E	3½	4250	4¼x5½	36x8	36x8	I
Duty, 21	2	1490	3½x5	34x3½	34x5	I
Eagle, 100–2	2	2275	3¾x5¼	34x4*	34x7*	I
Erie, E	1½	....	3¾x5¼	36x6†	36x6†	W
Erie, A	2½	....	4¼x5½	36x4	36x4d	W
F.W.D., B	3	4200	4¾x5½	36x6	36x6	B
Facto, 1921	2½	2295§	4¼x5½	36x4*	36x8*	W
Fageol, 1½	1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, 2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol, 3½	3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, 5	5	5700	4½x6¼	36x6	40x6d	W
Fargo, R	2	1900	3¾x5	36x4	36x6	I
Federal, SD	1½	1800	3¾x5	35x5†	36x6†	W
Federal, TE	1½	2175	4¼x5¼	36x3½	36x5	W
Federal, UE	2	2425	4¼x5¼	36x4	36x7	W
Federal, WE	3½	3150	4½x5½	36x5	36x5d	W
Federal, X2	5–6	4550	4¾x6	36x6	40x6d	W
Ford, TT	1	430	3¾x4	30x3½*	32x4½*	W
Forschler, A	1	....	3½x5	34x3	34x4	W
Forschler, AX	1½	....	3½x5	36x3½	36x5	W
Forschler, B	2	....	4½x5¼	36x4	36x7	W
Forschler, BX	3	....	4½x5¼	36x4	36x8	W
Front Drive C	1½	2800	3¾x5½	5	4	W
G & J** 20	1	2450	3⅝x5⅛	34x5†	34x5†	W
G & J** A	2	3850	4x5¼	36x4	36x7	W
G & J** B	3½	5175	4½x5½	36x5	36x5d	W
G.M.C., K16	1	1495	3½x5½	34x5†	34x5†	B
G.M.C., K41 A	2	3000	4 x5½	36x4*	36x7*	W
G.M.C., K71 A	3½	4250	4½x6	36x5	40x5d	W
G.M.C., K101A	5	4650	4½x6	36x5	40x6d	W
G.W.W.	1½	1950	3¾x5½	35x5	35x5	I
Garford, 15	¾	1590	3⅝x5⅛	34x5†	34x5†	W
Garford, 25	1¼	1990	3¾x5⅛	36x3½	36x4	W
Garford, 70-H	2	$2750	4¼x5½	36x4	36x7	W
Garford, 77D	3½	4300	4½x6	36x5	36x6d	W
Garford, 68D	5	5200	5 x6½	36x6	40x6d	W
Garford, 150-A	7½	5500	5x6½	36x6	40x7d	C
Gary, F	1	2100	3¾x5	36x3½	36x4	W
Gary, I	1½	2550	4 x5½	36x3½	36x5	W
Gary, J	2½	3150	4¼x5½	36x4	36x7	W
Gary, K	3½	4050	4½x6	36x5	40x5d	W
Gary, M	5	5150	5 x6½	36x6	40x6d	W
Gersix, M	1½	3100	4 x5½	36x3½	36x7	W
Gersix, K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	4500	4½x6	36x5	40x12	W
Golden West, GH	3	4500	4½x6	36x7	36x7	W
Golden West, G	3½	5000	4½x5½	36x6	36x6	W
Graham Bros. 1-Ton	1	1370	3⅞x4½	36x4½	34x5	B
Graham Bros. A	1½	1430	3⅞x4½	33x4½†	36x6†	B
[1]Gramm-Pion. 10	1	1365§	3½x5	33x5†	33x5†	F
[1]Gramm-Pion. 15	1½	1900§	3¾x5	36x3½*	36x5*	I
[1]Gramm-Pion. 65	1½	2500§	3¾x5	36x3½*	36x5	W
[1]Gramm-Pion. 20	2	2925§	4½x5¼	36x4*	36x7*	W
[1]Gramm-Pion. 30	2½	3275§	4½x5½	36x4*	36x4d*	W
[1]Gramm-Pion. 40	3½	3995§	4½x5½	36x5	36x5d*	W
[1]Gramm-Pion.75-P	3½	4225§	4½x5½	36x6†	42x9†	W
[1]Gramm-Pion. 50	5	4895§	4¾x6	36x6	40x6d*	W
Hahn, J4	1	....	3¾x5	34x5*	34x5*	W
Hahn, CD	1½	....	4½x5¼	36x3½*	36x6*	W
Hahn, EE	2½	....	4½x5½	36x4*	36x8*	W
Hahn, F	3½	....	4½x5½	36x5*	36x10*	W
Hahn, EF	5	....	4¾x6	36x6	40x12	W
Hal-Fur, E	1½	2350	4 x5¼	34x5†	38x7†	W
Hal-Fur, B	2½	3000	4½x5½	35x5*	38x7*	W
Hal-Fur, F	3½	4000	4½x5½	36x6†	40x10†	W
Hall, 1½	1½	3100	3¾x5	34x5†	38x7†	W
Hall, 2½	2½	3275	4½x5¼	36x4	36x6	W
Hall, 3½	3½	4100	4½x5½	36x5	36x5d	W
Hall, 5	5	5100	4½x5½	36x5	40x6d	W
Hall, 7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey, WEA	1½	2550	4½x5½	34x3½	34x5	W
Harvey, WOA	2	2950	4½x5½	34x4	34x7	W
Harvey, WFA	2½	3300	4½x5½	36x4	36x7	W
Harvey, WHA	3½	3950	4½x6	36x5	36x5d	W
Harvey, WKA	5	4500	4½x6	36x6	40x6d	W
Hawkeye, K	1½	1850	3¾x5¼	34x3½*	34x5*	I
Hawkeye, M	2	2650	4½x5½	36x4*	36x6*	I
Hawkeye, N	3½	3700	4½x6	36x5*	36x10*	I
Hendrickson, N	2½	3150	4¼x5¾	36x4*	36x7*	W
Hendrickson, M	3½	3975	4¼x5¾	36x5*	36x5d*	W
Huffman, B	1½	1995	3¾x5	34x3½	34x6	W
Huffman, C	1½	1795	3¾x5½	34x3½	34x6	I
Hurlburt A	1½	2850	4 x5½	34x4	34x5	W
Hurlburt B	2½	3750	4½x5½	36x4	36x4d	W
Hurlburt C	3½	4590	4½x6	36x5	36x5d	W
Hurlburt D	5	5500	4½x6	36x5	40x6d	W
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	W
Indep'd't(Iowa), G	1½	2040	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.), H.1	2½	2940	4½x5¼	34x4	34x6	I
Indep'd't(Ohio), F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio), H	2½	3085	4½x5¼	36x4	36x4d	W
Indep'd't(Ohio), K	3½	3985	4½x5½	36x5	36x5d	W
Indiana, 12	1½	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20	2	....	4½x5½	36x4*	36x7*	W
Indiana, 25	2½	....	4½x5½	36x4*	36x8*	W
Indiana, 35	3½	....	4¾x5½	36x5*	36x5d*	W
Indiana, 51	5	....	5 x6¼	36x5*	40x6d*	W
Inland, D	2	2950	4 x5	34x5	34x6	I
International, S	¾	1500	3½x5	34x5†	34x5†	I
International, 21	1	1750	3½x5¼	36x3½	36x3½	I
International, 31	1½	1850	3½x5¼	36x3½	36x4	I
International, 41	2	2100	3½x5¼	36x3½	36x5	I
International, 61	3	2400	4½x5	36x4	36x6	I
International, 101	5	3600	4½x5	36x5	40x10	I
J & J, D	2	3250	4 x5	34x4*	34x6	I
Jackson, 4WD	3½	3850	4½x5½	36x7	36x7	B
Jumbo, 15	1½	2425	3¾x5½	36x3½	36x5	I
Jumbo, 20	2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25	2½	3090	4½x5½	36x4	36x7	I
Jumbo, 30	3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35	3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40	4	4730	4½x6	38x7†	44x10	I
K-Z, 1	1	1750	3½x5	34x3½	34x5	W
K-Z, 1½	1½	2075	3¾x5	36x4	36x6	W
K-Z, 2½	2½	2550	4½x5¼	36x4	36x8	W
K-Z, 3½	3½	3350	4½x5½	36x5	40x10	W
K-Z, 5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo, G-1	1½	2495	3¾x5	34x4	34x5	W
Kalamazoo, G-2	1½	2800§	3¾x5	36x5	36x6	W
Kalamazoo, H	2½	3275§	4 x6	36x4	36x8	W
Kalamazoo, K	3½	4000§	4¼x6	36x5	36x10	W
Kalamazoo K-5	5	4500§	4½x6	36x6	36x6d	W
Karavan, A	2½	3900	4¼x6	36x4	36x8	W
Kearns, H	1	1600	3¼x4½	32x4½†	32x4½†	I
Kearns, N	2	2200	3½x5	34x3½	34x6	I
[2]Kelly-S., K-31	1½	2900	3¾x5¼	36x3½	36x6	C
[2]Kelly-S., K-34	1½	2900	3¾x5¼	36x3½	36x6	W
[2]Kelly-S., K-38	2½	3250	3¾x5¼	36x4	36x4d	W
[2]Kelly-S., K-35	2½	3250	3¾x5¼	36x4	36x4d	C
[2]Kelly-S., K-40	3½	4200	4½x6½	36x5	40x5d	C
[2]Kelly-S., K-41	3½	4200	4½x6½	36x5	40x5d	I
[2]Kelly-S., K-42	3½	4200	4½x6½	36x5	40x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

1—Gramm-Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
[3]Kelly-S., K-45	4	$4550	4½x6½	36x5	40x6d	C
[3]Kelly-S., K-50	5	4900	4½x6½	36x6	40x6d	C
[3]Kelly-S., K-60	6	5100	4½x6½	36x6	40x7d	C
Keystone, 40	2	2450	3¾x6½	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4¼x6	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x12	W
Kimball, AF	5	5800	5 x6	36x6	40x7d	W
Kissel, Express	1	1985††	3½x5½	34x5†	34x5†	W
Kissel, Utility	1½	1975	3½x5½	36x3½	36x5	W
Kissel, Freighter	2½	2875	4¼x5½	36x4	36x7	W
Kissel, H. D.	4	3675	4¼x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5¼	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, BB	2	3600	4½x5¼	36x4*	36x7*	W
Kleiber, B	2½	3950	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber, D	5	5300	5 x6½	36x6	40x12	W
Koehler, D	1½	1995	3½x5	34x3½	34x5	W
Koehler, M	2½	3175	4 x5½	36x4	36x7	W
Koehler, MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler, F	3½	4150	4½x5½	36x5	36x10	W
Koehler, MT, Trac	5	3275	4 x5½	36x4	36x7	W
Lange, B	2½	3350	4½x5¼	36x4*	36x7*	C
Larrabee, X-Z	1	1925	3½x4½	34x5†	34x5†	B
Larrabee, U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee, K	2½	3200	4½x5¼	36x4	36x7	W
Larrabee, L-4	3½	4000	4½x5½	36x5	36x5d	W
Larrabee, W	5	4800	4¼x6	36x6	40x6d	W
Luedinghaus, C	1	1695	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2490	3¾x5¼	34x3½*	34x5*	W
Luedinghaus, K	2-2½	3150	4½x5¾	30x4*	36x7*	W
Maccar, L	1½	2700	4½x5¼	36x4	36x6	W
Maccar, H-A	2	3100	4½x5¼	36x4	36x4d	W
Maccar, H-2	3	3400	4½x5½	36x4	36x4d	W
Maccar, M-2	4	4200	4½x6	36x5	36x5d	W
Maccar, G	5-6	4950	4¾x6	36x5	40x6d	W
MacDonald, A	7½	5750	4½x6	40x7	40x14	I
Mack, AB D.R.	1½	3450	4 x5	36x4	36x3½d	D
Mack, AB	2½	3400	4 x5	36x4	36x4d	C
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac, AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac. AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	4150	4 x5½	36x4	36x7	W
Mapleleaf, BB**	3	4775	4¼x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5770	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6490	4½x5½	36x6	40x6d	W
Master, JW	1½	2690	4½x5½	34x3½	34x5	W
Master, W	2½	3290	4¼x5½	34x4	36x7	W
Master, D	2½	3540	4¼x5½	34x4	36x7	D
Master, A	3½	4190	4½x6	36x5	40x5d	W
Master, E	3½	4640	4½x6	36x5	40x5d	D
Master, B	5	5290	4¾x6½	36x6	40x6d	W
Master, F	5	5440	4¾x6½	36x6	40x6d	D
Master Trac., T	6	3740	4¼x5½	34x4	36x7	D
Maxwell, 1½	1½	932	3½x4¼	32x3	32x4	W
Menominee, HT	1	2080	3¾x5	34x3½	36x5	W
Menominee, H	1½	2725	4 x5	36x3½	36x5	W
Menominee, D	2	3245	4 x6	36x4	36x8	W
Menominee, G	3½	4270	4½x6	36x5	36x10	W
Menominee, J-3	5	5450	4¾x6	36x6	40x12	W
Moline, 10	1½	1985	3½x5	34x5†	36x6†	I
Moreland, 21B	1½	2800	4½x5½	36x3½	36x6	W
Moreland, 21C	2½	3500	4½x5½	36x4	36x8	W
Moreland, 21H	3½	4600	4¾x6	36x5	40x5d	W
Moreland, 21J	5	5000	4¾x6	36x6	40x6d	W
Napoleon, 7	¾	1350	3½x5	38x4	33x4†	I
Napoleon, 9	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1860	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5¼	35x5	36x6	I
Nash, 3018	2	2550	3¾x5¼	36x6	40x8	I
Nash, Quad.	2	3250	4¼x5½	40x8	40x8	I
Nash, 5018	2½	2550	3¾x5¼	34x4	34x6	I
[3]Nelson, F1½	1½	....	4½x5¼	36x3½	36x5	W
[3]Nelson, F2	2	....	4½x5¼	36x4	36x7	W
[3]Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
[3]Nelson, FC5	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2-2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2100	3¾x5¼	36x3½	36x5	W
Noble, C40	2	2675	4 x5½	36x4	36x7	W
Noble, D50	2½	2950	4¼x5½	36x4	36x8	W
Noble, E70	3½	3800	4½x6	36x5	36x10	W
Northway, B-2	2	3400	4 x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
Northwestern W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk, 25E	1	1695	3½x5	34x3½	34x4	W
Norwalk, 35E	1½	2025	3½x5	34x3½	34x3½d	W
Norwalk, 35E. Spec	1½	2285	3¾x5¼	34x3½	34x5	W
O. K., K1	1½	$2675	4 x5½	36x3½	36x5	W
O. K., L1	2½	3450	4½x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Ogden, A1	1½	2375	3¾x5	36x3½	36x5	W
Ogden, E	2½	2975	4½x5¼	36x4	36x7	W
Old Hickory, W	1	2175	3¾x5	36x3½*	36x4*	W
Old Reliable, A	1½	2350	4 x5	34x4	36x6	W
Old Reliable, B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	3½	4250	4¼x6	36x5	36x5d	W
Old Reliable, D	5	5250	4¾x6	36x6	40x6d	W
OldReliable, KLM	7	6000	4¾x6¼	36x6	40x7d	C
Oldsmobile Econ.	1	1095	3½x5¼	35x5†	35x5†	I
Olympic, A	2½	3500	4¼x5½	36x4	36x7	W
Oshkosh, A	2	3750	3½x5	36x6†	36x6†	4
Oshkosh, AA	2	3850	3½x5	36x6†	36x6†	4
Oshkosh, B	2½	4150	4 x5½	38x7†	38x7†	4
Oshkosh, BB	2½	4300	4 x5½	38x7†	38x7†	4
Packard, EC	1½-3	3500	4¼x5½	36x4	36x7	W
Packard, EX	1½-3	4000	4¼x5½	36x6†	40x8†	W
Packard, ED	2-4½	4100	4½x5½	36x5	36x5d	W
Packard, EF	4-7½	4500	5 x5½	36x6	40x6d	W
Paige, 52-19	1½	2880	4 x5¼	34x3½	34x5	W
Paige, 54-20	2½	3400	4¼x5½	34x4	34x8	W
Paige, 51-18	3½	4285	4½x5½	36x5	36x5d	W
Parker, FZ0	2	3500	4 x6	34x4	36x4d	W
Parker, JZ0	3½	4400	4½x6	36x5	40x5d	W
Parker, MZ0	5	5500	4¾x6	36x6	40x6d	W
Patriot, Revere	1	1500	3¾x5	35x5†	35x5†	W
Patriot, Lincoln	2	2050	4 5¼	34x3½	34x5	W
Patriot, Washgt'n	3	2900	4½x5½	36x4	36x7	W
Piedmont, 4-30	1	1200	3½x5	34x4†	34x4†	W
Pierce-Arrow	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	4850	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1550	3¾x4¼	32x4½†	32x4½†	W
Pittsburger, C-21	3	3800	4½x5¼	36x5*	36x7*	W
Power, F	2	3400	3¾x5¼	36x6	36x6	W
Power, C	3½	4500	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Rainier, R-21	¾	1990	3½x5	35x5†	35x5†	W
Rainier, R-19	1	2150	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2490	3¾x5	34x3½	34x5	W
Rainier, R-18	2	2890	4¼x5¼	34x4	34x8	W
Rainier, R-20	2½	3550	4½x5¼	34x4	34x7	W
Rainier, R-15	3½	4400	4½x5½	36x5	36x5d	W
Rainier, R-17	5	5100	4½x6	36x6	36x6d	W
Ranger, TK-22-2	2	2775	3¾x5	36x6†	38x7†	W
Reo, F	¾-1¼	1245	4½x4½	34x4½†	34x4½†	B
Reliance, 10A	1½	2400	4 x5½	36x3½	36x5	I
Reliance, 20B	2½	3100	4¼x5½	36x4	36x4d	I
Republic, 7S	¾	1395††	3½x5	32x4½	32x4½	I
Republic, 10	1	1395	3¾x5	35x5†	35x5†	I
Republic, 10Exp.	1	1695	3¾x5	35x5†	35x5†	I
Republic, 11X	1½	1795	3¾x5	34x3½	34x5	I
Republic, 19	2½	2155	4¼x5¼	36x4	36x7	I
Republic, 20	3½	3095	4½x5½	36x5	36x10	I
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, C. D. W.	2	3300	4 x5	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	34x5	36x5d	W
Rowe, G. P. W.	3	5250	3¼x5‡	38x7†	42x9†	W
Rowe, HW	4	4509	4¼x6	36x5	36x6d	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2590	3¾x5	34x4	34x6	W
Sandow, J	2½	3275	4¼x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	3350	4½x5¼	36x4	36x4d	W
Sanford, 35	3½	4200	4½x5½	36x5	36x5d	W
Sanford, 50	5	5100	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht, 3-Ton	3	3800	4¼x5½	36x5	36x5d	W
Schacht, 4-Ton	4	4200	4¼x6	36x5	36x5d	W
Schacht, 5-Ton	5	4400	4½x6	36x5	40x5d	W
Schacht, 7-Ton	7	5000	4½x6	36x6	40x7d	W
Schwartz, A	1	1695	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2690	3¾x5¼	34x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 1½A	1½	2360	3¾x5	34x3½	34x5	W
Selden, 2½A	2½	3425	4½x5¼	36x4	36x7	W
Selden, 3½A	3½	4175	4½x5½	36x5	36x10	W
Selden, 5A	5	5600	4¾x6	36x6	40x12	W
Seneca, M	½	1020	3½x4½	30x3½†	30x3½†	B
Service, 15	1¼	1840	3½x5	34x4½	35x5	B
Service, 220	1½	2415	3½x5¼	34x3½	34x5	W
Service, 31	2	2985	4 x5½	36x3½	36x6	W
Service, 36	2	3415	4¼x5½	35x5†	38x7†	W
Service, 51	2½	3475	4¼x5½	36x4	36x7	W
Service, 71	3½	4285	4¼x5½	36x5	36x5d	W
Service, 76	3½	4485	4½x6	36x5	36x5d	W
Service, 101	5	5275	4½x6	36x6	40x6d	W
Signal, NF	1	1950	4¾x5	34x5†	36x6†	W
Signal, H	1½	2450	4¼x5¼	34x4	36x6	W
Signal, J	2½	2875	4¼x5¼	34x4	36x8	W
Signal, MJ	3½	3675	4½x5½	36x5	40x5d	W
Signal, R	5	$4400	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x3½	34x4	W
Southern, 15	1½	2590	3¾x5½	36x6†	34x4	W
Southern, 20	2	2090	4¾x5¼	36x6†	40x8*	W
Standard, 1-K	1½	1600	3¾x5	34x3½*	34x5*	W
Standard, 76	2½-3	2400	4½x5¼	36x4*	36x7*	W
Standard, 66	3½-4	3150	4½x5½	36x5	36x10	W
Standard, 5-K	5-7	4400	4¾x6	36x6	40x12	W
Sterling, 1½	1½	2885	4 x5¾	36x3½	36x5*	W
Sterling, 2	2	3085	4 x5¾	36x4	36x6	W
Sterling, 2½	2½	3290	4¾x5¾	36x4*	36x4d*	W
Sterling, 3½	3½	4325	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	4950	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6000	5 x6¼	36x6	40x7d	C
Stewart, 14	¾	1195	3½x5½	32x4½†	32x4½†	I
Stewart, 15	1	1395	3½x5½	35x5†	35x5†	I
Stewart, 9	1½	1790	3¾x5	34x3½	34x5	I
Stewart, 7	2	2090	4¼x5¼	34x4	34x7	I
Stewart, 7-X	2½	2290	4¼x5½	34x4	34x7	I
Stewart, 10	3½	3090	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, C	¾	1240	3½x5	34x4½†	34x4½†	W
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5½	36x4	36x7	W
Stoughton, F	3	3600	4¼x5½	36x5d	36x5d	W
Sullivan, E	2	3350	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	4650	4½x6	36x5	36x5d	W
Superior, D	1	1650	3¾x5	34x4½†	34x4	I
Superior, E	2	2600	4½x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck, 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Tiffin, GW	1½	2400	4½x5¼	36x3½	36x5	W
Tiffin, MW	2½	3100	4½x5¼	36x4	36x3½d	W
Tiffin, PW	3½	4100	4½x5½	36x5	40x5d	W
Tiffin, F50	5	4800	4¾x6	36x6	40x6d	W
Tiffin, F60	6	5000	4¾x6	36x6	40x12	W
Titan	3½	4100	4¼x5½	36x5	36x10	I
Titan	5	4750	4½x6	36x5	40x6d	I
Titan —	2	2850	4x5	34x4*	36x7	I
Titan, 6-Ton	6	5150	4½x6	36x5	40x12	I
Tower, J	1½	2900	4½x5¼	35x5	38x7	W
Tower, H	2½	3200	4½x5¼	36x4	36x7	W
Tower, G	3½	4100	4½x5½	36x5	36x5d	W
Traffic, C	....	1595	3¾x5	34x3½*	34x5*	I
Traffic	3	1895	3¾x5	36x4	36x7	I
Transport, 20	1	1395	3¾x5½	34x3½	34x4	I
Transport, 30	1½	1995	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	3885	4½x6	36x5	36x10	I
Traylor, B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor, C	2	2850	4 x5½	36x4	36x7	W
Traylor, D	3	3300	4¼x5½	36x4	36x8*	W
Traylor, E	4	4450	4½x6	35x5	40x10	W
Traylor, F	5	4700	4¾x6	36x6	40x6d	W
Triangle, AA	¾-1	1385	3½x5	34x4½†	34x4½†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5¼	36x4*	36x7*	I
Triumph, G	1	1995	3¾x5½	34x5†	34x5†	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, HB	2	2900	3¾x5½	36x4	36x7	W
Twin City, B.W.	2	2750	4 x5½	36x4	36x7	I
Twin City, A.W.	3½	4000	4¼x6	36x5	40x5d	W
Twin City, B	3½	....	5½x6	36x6	36x6	I
Twin City, A	5	....	5½x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½*	36x6*	W
Ultimate, AJ	2	3250	4¼x5½	35x5†	38x7†	W
Ultimate, AJL	2	3300	4½x5½	36x3½	36x6	W
Ultimate, B	3	3750	4¼x5½	36x4*	36x4d*	W
Ultimate, BL	3	3850	4¼x5½	36x4*	36x4d*	W
Union, FW	2½	3490	4 x6	36x5*	36x8*	D
Union, HW	4	4485	4½x6	36x6	40x12	D
Union, JW	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½*	34x5*	I
United, B	2½	3150	4¼x5½	36x4*	36x7*	I
United, C	3½	3975	4¼x5½	36x5	36x5d	I
United, V	5	5000	4½x6	36x6	40x6d	I
United States, N	1½	1975	3¾x5	36x3½*	36x5*	I
United States, R	3	3075	4 x5¼	36x4	36x4d	W
United States, S	4	3875	4½x5½	36x5	36x5d	W
United States, T	6	4850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	1585	3¾x5	36x3½	36x5	I
Veteran, E**	1-1½	3500	3¾x5¼	35x5†	36x6†	W
Veteran, A**	2-2½	4000	4¼x5½	36x4*	38x7*	W
Veteran, D**	2½-3	4400	4¼x5½	36x4*	36x7*	W
Veteran, H**	3½-4	5600	4¼x6	36x5	36x5d	W
Vim, 29	½	1650	3½x4½	31x4†	31x4†	W
Vim, 30	½	1175	3½x4½	32x4½	32x4½	W
Vim, 31	1	1975	3¾x5½	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5½	36x4	36x6	W
Vim, 23	3	3950	4½x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4500	4¼x6	36x6	40x8	W
Walker-JohnsonA	1½-2	2750	3¾x5	34x5	38x7	W
Walker-Johnson, B	3	3500	4¼x5½	36x4	36x8	W
Walter, S	5	4850	4½x6¼	36x6	40x6d	W
Ward-LaF., 2B	2½	3590	4½x5¾	36x4	36x7	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. ‡—Price includes several items of equipment.

2—Kelly-Springfield. 3—Nelson Le Moon. 4—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Ward-LaF., 4A	3½	$4690	4½x6¼	36x5	36x5d	W
Ward-LaF., 5A	5	5590	5 x6¼	36x6	40x6d	W
Watson, E	1	1785	3¾x5¼	35x5†	35x5†	W
Watson, N	3½	3825	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5¼	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2400	3¾x5½	34x5†	34x5†	B
White, 20	2	3250	3¾x5½	36x4*	36x7	D
White, 40	3½	4200	3¾x5¾	36x5	40x5d	D
White, 45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick., E	1	1225	3¾x5	34x5†	34x5†	W
White Hick., H	1½	1375	3¾x5	36x3½	36x5	W
White Hick., K	2½	1675	4¼x5¼	36x4	36x5	W
Wichita, K	1	2300	3¾x5¼	36x3*	36x4*	W
Wichita, L	1½	2600	3¾x5¼	36x3½*	36x5*	W
Wichita, M	2	2800	3¾x5¼	36x3½*	36x6*	W
Wichita, R	2½	3000	3¾x5¼	36x4*	36x7*	W
Wichita, RX	2½	$3600	4¼x6	36x4*	36x8*	W
Wichita, O	3½	4000	4¼x6	36x5*	36x5d*	W
Wichita, S	5	5000	4½x6	36x6	40x6d	W
Wilcox, AA	1	1930	3¾x5½	36x1*	36x1*	W
Wilcox, BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox, D	2½	3930	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	3950	4½x6	36x5*	36x5d*	W
Wilcox, F	5	4350	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2270	3¾x5	36x3½	36x5	W
Wilson, EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson, G	3½	3695	4½x5½	36x5	36x5d	W
Wilson, H	5	4520	4¾x6	36x6	40x6d	W
Winther, 751	1	$1795	3½x5	34x4½†	35x5†	I
Winther, 430	1½	2850	3¾x5	32x4	32x4	I
Winther, 39	1½	2450	3¾x5	34x3½	34x5	I
Winther, 49	2	3250	4 x5	34x4	34x4d	I
Winther, 50	2½	3995	4 x6	38x7†	42x9†	I
Winther, 70	3½	4200	4 x6	36x5	36x5d	I
Winther, 450	2½	3690	4 x5	34x5	36x6	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Wisconsin, B	1	1950	4 x5¾	34x5†	34x5†	W
Wisconsin, C	1½	2500	4¾x5¾	36x6†	36x6†	W
Wisconsin, D	2½	3500	4½x6¼	36x6	36x10	W
Wisconsin, E	3½	4000	5 x6¼	36x6†	36x12†	W
Witt-Will, N	1½	2750	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	3250	4½x5¼	36x3½*	36x7*	W
Wolverine, J	1	2125	3½x5	34x3	34x4	I
Wolverine, J	1½	2375	3¾x5	34x3½	34x5	I
Wolverine, J	2	2640	3¾x5	34x4	34x7	I
Wolverine, J	2½	3425	4½x5¼	36x5	36x10	I
Wolverine, L	3½	4100	4½x5½	36x5	36x10	I

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	16-30	$1975	3	Clim.	4-5 x6½	GDK	3-4
Allis-Chalm. B	6-12	925	2	LeR.	4-3½x4½	Gas.	1
Allis-Chal.G.P	6-12	795	2	LeR.	4-3½x4½	Gas.	1-2
Allis-Chalm.	12-20	1350	2	Midw.	4-4½x5¼	Gas.	2-3
Allis-Chalm.	18-30	2150	4	Own	4-4¾x6½x	GorK	3-4
Allis-Chalm.	10-18	875	4	Own	4-4¾x6½	G,K	4
Allwork...2-G	14-28	1775	4	Own	4-4¾x6	GorK	3
Allwork....C	14-28	1525	4	Own	4-5 x6	GorK	4
AndrewsKin.D	18-36	2500	4	Clim.	4-5 x6½	GorK	4
Appleton	12-20	1500	4	Buda	4-4½x5½	G,K	2-3
ARO..1921-22	3-5	495	4	Own	1-4½x5	Gas.	1
Aultman-T.	15-30	2200	4	Clim.	4-5 x6½	G,K	4
Aultman-T.	22-45	3420	4	Own	4-5½x8	G,K	6
Aultman-T.	30-60	4500	4	Own	4-7 x9	G,K,D	8
Automot. B-3	12-24	1785	4	Herc.	4-4 x5	Gas.	2-3
Avery,SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4¾x6	G,K,D	2-3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4¾x7	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates Mule .H	15-25	....	4	Midw	4-4½x5¼	Gas	3
Bates Mule, F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
Bates Mule, G	25-35	....	*2	Midw	4-4½x6	Gas.	com.
Beeman,....G	2-4	315	4	Own	1-3½x4½	Gas.	..
Best.....	30	3100	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	5450	*2	Own	4-6½x8½	G,K,D	8-9
Boring...1921	.....	1850	3	Wauk	4-4¾x5¾	GorK	2
Burn-Oil, 1922	15-30	1495	4	Own	2-6¾x7	Ker.	3-4
Capital.....	15-30	1000	2	Own	4-4¾x6	Gas.	3
Case.....	10-18	800	4	Own	4-3¾x5	GorK	2
Case.....	15-27	1680	4	Own	4-4½x6	GorK	3
Case.....	22-40	3100	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	3975	*2	Own	4-4¾x6	Gas.	4
Caterpillar T16	40	6050	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	385	2	N Way	2-4½x4½	GorK	1
Chase.....	12-25	1725	3	Buda	4-4¼x5½	GorK	2-3
Chicago....40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac.....F	9-16	845	*2	Own	4-3¼x4½	G,K,D	2
Cletrac.....W	12-20	1495	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1500	3	Dom,	4-4¾x6	Gas.	3
Dart.....B.J.	15-30	1800	4	Buda	4-4½x6	Gas.	3-4
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All....A	3-6	595	..	Own	1-4½x5	Gas.	1
Eagle.....F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....F	16-30	....	4	Own	2-8 x8	GorK	4-5
E-B. AA	12-20	1445	4	Own	4-4¾x5	G,K,D	3
E-B.....Q	12-20	925	4	Own	4-4¾x5	G,K,D	3
E-B.....	16-32	2080	4	Own	4-5½x7	G,K,D	4
Evans.....	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol.....D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4
Farquhar.....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch.....4	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City....	20-35	....	4	Own	4-5¼x6	Ker.	4-6
Flour City....	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City....	40-70	....	4	Own	4-7½x9	Ker.	8-10
Fordson.....	.....	625	4	Own	4-4x5	G,K	2
Fox.....E	20-40	3100	4	Own	4-5½x7½	G or K	4
Franklin....G	18-30	4090	*2	Clim.	4-5 x6½	G or K	3-4
Franklin....C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3-4
Franklin...G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt...A	18-36	$2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray.....1920	18-36	2000	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog..	19-31	2000	4	Erd.	4-4 x6	G or K	3
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	945	4	Own	2-5¼x6½	K,D.	2
Hart-Parr..30	30	1295	4	Own	2-6½x7	K,D.	3
Heider.....D	9-16	1170	4	Wauk	4-4¼x5¾	G,K	2
Heider.....C	12-20	1395	4	Wauk	4-4¾x6¾	G,K	3
Heider...Cult	6-10	1050	4	LeR.	4-3½x4½	Gas.	1
Hicks.....	20-30	....	4	....	4-4½x6	K or G	4
Huber Light 4.	12-25	1185	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois, Super-Drive.....C	18-30	....	4	Clim.	4-5 x6½	G,K	4
Imperial...E	40-70	4500	4	Own	4-7½x9	G,K,D	10
Indiana.....F	5-10	895	2	LeR.	4-3½x4½	Gas.	1-2
International.	8-16	900	4	Own	4-4¼x5	G,K,D	2
International.	15-30	1750	4	Own	-5¼x8	G,K,D	4
J-T.....N	20-40	....	*2	Chief.	4-4¾x6	G,K,D	3-4
Klumb.....F	16-32	1475	4	Clim.	4-5 x6½	....	..
Knudsen.1920	25-45	2500	4	Own	4-5 x9	Gas	4-6
LaCrosse...M	6-12	650	4	Own	2-4 x6	G,K	1
LaCrosse...G	12-24	985	4	Own	2-6 x7	G or K	3
Lauson.....5	12-25	1495	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....20	15-25	1685	4	Beav	4-4½x6	G or K	3-4
Lauson.....21	15-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Lauson Road.	15-30	2225	4	Beav.	4-4¾x6	K	..
Leader.....B	12-18	1095	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader....GU	18-35	2775	*2	Clim.	4-5 x6½	G,K	3-4
Leonard....E	20-30	2530	4	Buda	4-4½x6	G,K	3
Linn.....H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn.....W	60	5100	*	Wauk	4-5 x6¼	Gas	6
Little Giant, B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant, A	26-35	3300	4	Own	4-5½x6	K	6
Lombard.1921	85-150	....	*2	....	6-5½x6¾	Gas.	16
Lombard.1921	50	....	*2	....	4-4¾x6½	....	6-10
Magnet.....B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Master Jr.....	5-10	585	..	LeR.	-2¾x4	Gas.	1
MerryGar1921	2	230	2	Evin	1-2¾x2½	Gas.	..
Minne...All-P	12-25	900	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1675	4	Own	4-4¾x7	G or K	3-4
Minne. Med.Duty	22-44	3000	4	Own	4-6 x7	G or K	5-6
Minne. HeavyDuty	35-70	4150	4	Own	4-7½x9	G or K	8-9
Mohawk .1921	8-16	785	2	Light	4-3¼x4½	K or G	1-2
Moline Univ D	9-18	990	2	Own	4-3½x5	Gas.	2-3
Moline Orch..	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
Motox.....	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
NB.....1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep. 20-42.	20-42	3100	4	Own	8 x10	G or K	3-6
Nichols Shep. 25-50	25-50	3460	4	Own	9 x12	G or K	4-7
Nilson Senior..	20-40	2475	5	Wauk	4-5 x6¼	G,K	4
Oil Pull.....K	12-20	1485	4	Own	2-6 x8	K,D	3
Oil Pull.....H	16-30	2285	4	Own	2-7 x8½	K,D	4
Oil Pull.....G	20-40	3175	4	Own	2-8 x10	K,D	5-6
Oil Pull.....E	30-60	4590	4	Own	2-10x12	K,D	8-10
Oldsmar GarK	2½-5	395	4	Own	1-5½x5½	Gas.	1
Oliver.....A	15-30	....	*2	Beav.	4-4½x6	G or K	3-4
Once Over Tiller Mark..6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett.....K	15-30	1950	4	Pitt	4-4½x6	G,K	3
Peoria.....L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	18-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	30-60	....	4	Own	4-7 x8	Gas.	10
Plowman....A	15-30	1695	4	Buda	4-4½x6	G,K	3-4
Port Huron .A	12-25	$1500	4	Chief	4-3¾x6	G,K	3
Ranger Cul. T-20	8-16	....	4	LeR.	4-3½x4½	Gas.	1
Reed.....A	15-30	1985	4	Wauk	4-4½x6¼	G or K	3-4
Reed.....A-1	18-36	2185	4	Wauk	4-5 x6½	Gas.	4
Reliable.....	10-20	885	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4¼x5¾	G or K	3
Russell.....	12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell.....	20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson....M	..	....	4	Nor	4-4 x5½	G,K	2
Sandusky,...J	10-20	1250	4	Own	4-4¼x5½	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com.	6-12	....	2	LeR.	4-3½x4½	Gas.	1
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby.....C	10-20	....	4	Erd.	4-4 x6	G or K	2-3
Short Turn...	20-40	1500	3	Beav.	4-4¾x6	G,K	3
Steady Pull ..	12-24	1485	4	Own	4-4 x5	Gas.	3
Stinson....4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone.....	20-40	2250	4	Beav.	4-4¾x6	G,K	4
Tioga.....3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Titan.....	10-20	900	4	Own	2-6½x8	G,K,D	3
Topp.....B	30-45	3500	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro Cultivator	6-10	....	3	LeR	4-3½x4½	Gas.	2
Townsend....	10-20	895	2	Own	4-6½x7	Ker.	2-3
Townsend....	15-30	1485	2	Own	4-7 x8	Ker.	3-4
Townsend....	25-50	2750	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	....	4	....	8-3¼x5	Gas.	4-5
Traylor....TB	6-12	715	4	LeR.	4-3½x4½	Gas.	1-2
Triumph....H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar....10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Turner...1921	14-25	1295	4	Buda	4-4¼x5½	G,K	3
Twin City....	12-20	1580	4	Own	4-4¼x6	G,K	3
Twin City....	20-35	3175	4	Own	4-5½x6¾	G,K	5
Twin City....	40-65	5250	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Universal.....	1-4	475	2	Own	1-3½x5	G	1
Utilitor....501	2½-4	380	4	Own	1-3½x4½	G	1
Victory...1921	9-18	1350	4	Gray	4-3½x5	Gas.	2
Victory...1921	15-30	1750	4	Wauk	4-4¼x5¾	Gas.	3
Vim.....B	15-30	1650	4	Wauk	4-4¾x5¾	G,K	3
Wallis.....K	15-25	1600	4	Own	4-4¼x5¾	G,K	3
Waterloo....N	12-25	1450	4	Own	2-6½x7	G,K	3
Webfoot....53	28-53	5000	*2	Wisc.	4-5¾x7	G,D	6
Wellington..B	12-22	....	4	Erd	4-4 x6	Ker.	2-3
Wellington..F	16-30	....	4	Chief	4-4¾x6	Ker.	3-4
Western,.1920	16-32	2100	4	Clim.	4-5 x6½	Gas.	4
Wetmore21-22	12-25	1585	4	Wauk	4-4 x5¾	G,K	3
Whitney....B	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	G or K	3
Wisconsin...F	20-40	2450	4	Wauk	4-5 x6¼	G or K	4
Wisconsin,..H	22-40	3200	4	Clim.	4-5½x7	G or K	4-6
Yuba....12-20	12-20	2600	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba....15-25	15-25	3100	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....25-35	20-35	4185	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25-40	4650	*2	Wisc.	4-5¾x7	G,K,D	..
Zelle.....	12-25	....	4	....	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Strns.—Stearns. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type.